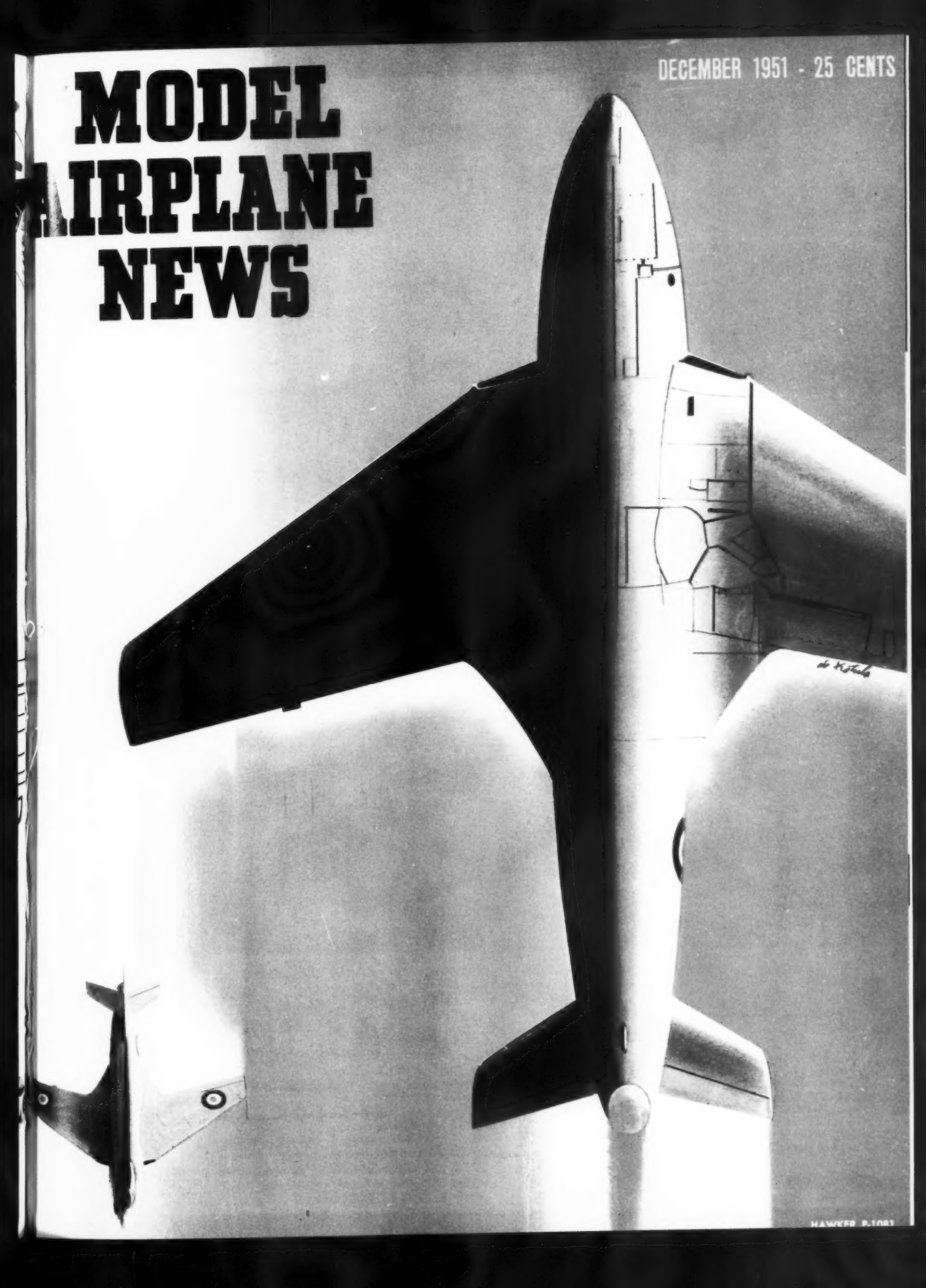
MODEL AIRPLANE NEWS

DECEMBER 1951 - 25 CENTS



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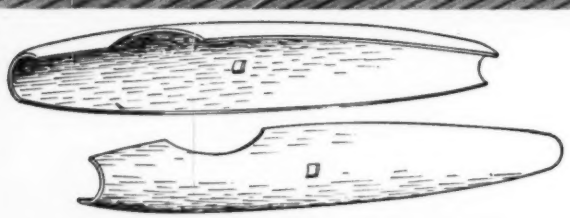

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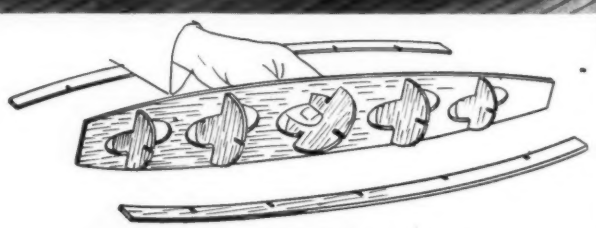

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by William Winter

▸ This December 1951 issue is one to be remembered. Even for M.A.N., the oldest continuously published magazine in the model airplane field, the collection of "names" that authored the impressive collection of articles and plans is awe inspiring.

▸ Dr. A. M. Lippisch, the world's pre-eminent authority on flying wings, who made possible the *Me-163* rocket fighter; Dave Anderton, engineering editor of *Aviation Week*, who reports from Europe; Gene Foxworthy, 1950 Nationals rc winner; Joe Nieto, who is accurate down to the last petcock and turnbuckle in those amazing drawings of his; Bob Hare, the outstanding authority on planes of another day. Then there are: Jo Kotula, popular cover and aviation advertising artist (he has been doing our covers for 20 years); Bjorn Karlstrom, who does recognition books for the Swedish Air Force, and a new series of three-views that come to M.A.N. each month—by air appropriately—from distant Stockholm; Barney Taft, National's free flight winner; Dick Ealy with top notch Greve Trophy winning *Firecracker*—thanks from scale fans, Dick; Don Grout, the model flying dealer. And where can you find such an inspirational article as Beverly Baumer's "Are We Forgetting the Kids?"

▸ Lawrence Conover, co-author of "Dr. Lippisch's Deltas," reminds us that the doctor has been building models since before World War I. He has been involved with zeppelins, the German Glider Youth movement, and with deltas and flying wings—one of which became the prototype of the *Me-163*, in 1937! He flew the first rocket plane in 1928. We have the Navy to thank for the Dr.'s presence now in the U. S.—and, therefore, for his refreshing article in this issue on truly modern models.

▸ Just before taking off for Europe, Anderton told us a story that will floor the radio fans. By 1945, the Germans had just about perfected the *Wasserfal*, a huge anti-aircraft rocket, not unlike the *V-2*. Tests of this diabolical contraption consisted of a vertical launch, followed by a 90 degree turn to the horizontal, a 180 to an overhead position, then a 90 back to the vertical, then another 180 to straight down. Done too perfectly, it might be supposed, the maneuvers would have liquidated the test crew. Finally, Roth, the project engineer, won a bet by looping one at a couple of thousand miles an hour!

▸ Covered the *Prop Spinners'* Annual contest, Hicksville, N. Y. Took along our rc job. You never know what you are getting into. Walker was there. Minus a launcher. So now we are an authority on how it feels to launch Jim's yellow monster. You run madly through knee-high weeds, stagger over old ploughed ditches—the model waving side to side, up and down—get set and heave it nose high. Then collapse. Three photogs threaten to blackmail!

▸ For laughs, teamed up with that mad pilot, Rosenstock, who made one flight with our machine. Judges held a worried consultation. Oh, we can't win; besides, it is an automatic protest! Norm walks over after the meet with the third place trophy. Jim made two flights, too, tossing in five wonderful consecutive loops, and got second. Fran McElwee, with radio troubles, nevertheless got fourth. (Chap named Higgenbottom, who flew, and flew, and flew, took us all.) No protest yet. You've got enough trophies, Fran, haven't you?

▸ The meet itself was terrific. California weather so, of course, there was a 30-minute total in A! Big, open field. Kind of meet you dream about. So good, in fact, that the field was spotted with fliers two hours after shut-down time.

▸ Not content with his rc flight, or with demonstrations of *Fire Baby's*, and a *Fireball* with a Fox 35 on 150 foot lines—what wingovers!—Jim took himself to Times Square in New York that night, put down the top of his convertible, then drove back and forth releasing *Ceiling Walkers*. When the taxi drivers started following him, yelling for models for the kids, the cops were their angriest and Jim his happiest.

(*Continued on page 56*)

MODEL AIRPLANE NEWS

Serving Aviation 23 Years

DECEMBER, 1951 VOL. XLV — NO. 6

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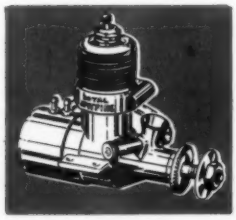

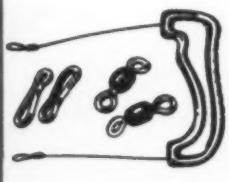

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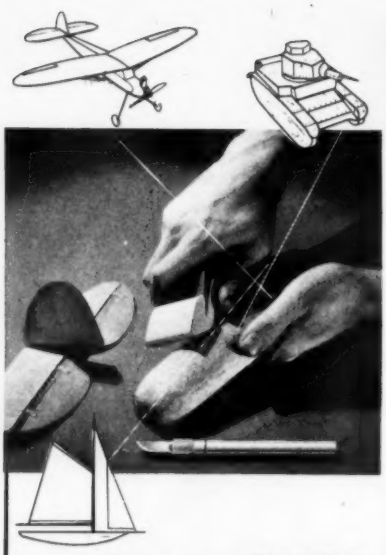

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▸ At the recent Long Beach *Thunderbugs'* Annual, AA engines were out in the usual numbers. But flyers were putting the larger ships back in the air, too. Our interest centered on one particular ship of Frank Uyematsu's. This job was built along the "pencil bomber" type with a 50 per cent moment arm. The fuse looked longer than the six foot wing. The *Torp .32* proved more than enough power for the odd design. With the speed gained in the climb, no dip was made when the engine shut off. It has been noted that the long moment-armed ships usually have the long pull-outs unless plenty of speed is gained in the climb or quite a bit of turn is built in or applied for glide. The ship takes the *Torp .29* and *.19* as well as the *.32*, and does mighty well with them all. The usual array of 45 and 50 per cent stab area ships were out but it was also apparent that some are going back to 33 per cent and even the comparatively small 25 per cent.

The radio controlled jobs also were out in force. This type of modeling is becoming more settled as per flight patterns to accomplish and general field rulings. The ships are more or less standard types at the present time; the cabin type, such as the *Rudder Bug*, being the most popular. Wayne Schindler had a big twin ruddered ship out with tri-cycle gear. The very popular Citizen Band radio with engine cut-off was used for equipment. Wayne used an extended stack on his Jorster engine—definitely a good idea. Exhaust blow-by seeping under the wing along with dirt or dust is strictly N.G. for the receiver, and Schindler definitely eliminated this bug.

* * *

The *Valley Hawks* are using a simplified flight plan that will undoubtedly be a basic mold for future R.C. meets and get togethers. The whole "plan" must be completed before points will be given for any acrobatic manuevers. Take-offs may be hand-launched, assisted, or R.O.G. The first manuever is usually a straight flight of 250 feet out to a marker and return. Other manuevers, such as *S* turns, figure eights, and the tough rectangular pattern around the transmitter with each leg at least 200 feet and parallel or perpendicular to the wind, must be completed. One new manuever has been added that had some of the boys a bit confused in other meets. This consists of a procedure-turn over a marker, and it too is a bit rough in the wind. The spectators enjoy the spot landings which usually mean the win or loss of any of the meets. A circle with a 100 foot diameter is drawn with four circles inside, including the bull's eye. Twenty points are given for a perfect spot landing which seems a bit low when 25 points are given for unassisted take-offs, that is, unless the operator has to taxi his ship out to a pair of markers and then take off. The two major frequencies are 54 and 465 megacycles at present. A red flag is hoisted when the 54 meg band is on and a blue flag is flown for the 465 band. It has been the misfortune of some of the flyers to have another contestant make a transmitter check at the wrong time. Results are disastrous. A contestant usually flies on one frequency while another makes a set-up and tests on the other band. Any testing done by anyone while flights are on is justification for immediate disqualification from the contest. Too bad the ones guilty of such acts can't be cured permanently by more strict action. A pilot is allowed five minutes to get into the air after the previous flight has been terminated; ten minutes when on the same frequency. After the "flight pattern" flight is completed, all subsequent flights will be limited to five minute engine runs.

* * *

We were having quite a discussion a few moons ago about the longevity of a free flight model's life. To get a clearer picture of the situation and to be able to put something down in black and white, we decided to take a poll involving 15 modelers in different age groups. We came up with some rather interesting information. These estimates were approximate guesses on the part of the modelers and an accurate tally of the nation was not what we had in mind when we took the poll but here it is. Actual successful flights of the model previous to the one being flown—42; props broken during life of model—five; different types of fuel used in engine—three; contests entered with ship, club and otherwise—four to five; times finger hit with prop—no comment! We are going to take a poll of the u-control flyers' answers at the next big meet to see how their answers stack up along side of the ff boys.

* * *

We ran into one of the old timers, Les Regan, at a recent contest. Les had quite an experience with one of his *Sailplanes*. It seems that at the 1st Internationals, Regan's ship went over the hill. He had a traveling box built that would take the ship very nicely, so he left it just in case someone found his ship. A few weeks later Regan was delighted to find that the box had been mailed back to him in California. When he opened the box, the ship was packed very carefully inside. Evidently the person who found it didn't know much about models or how to pack them. He had run the wing and fuselage through a band saw to make them fit inside the box better.

by Jim Saftig

MODELS, MODELERS BY MAN WHO GETS AROUND

Jim "A. J." Walker and sidekick, Charlie Goodale, with the help of the good ship *Firebaby*, have put more novice youngsters in the air than we could possibly count. We have seen hundreds of kids taught to fly and the number is still growing. At the present time all points west is the area covered by Charlie and a look at any playground or flying circle will usually find plenty of the "baby" jobs in the air. U-control has been taking a back seat to the ff jobs lately, and, the swarm of little jobs has given it a much needed shot in the arm.

* * *

The "never say die" Team Racing flyers are still going great. This type of racing has spread out so much that circuits are being set up to take care of the increasing number of flyers. In the southern California area, races are held at the Santa Anita parking lots, the Santa Ana site, and now San Diego has been brought into the circuit. Les McBrayer, Keith Storey, the Williams brothers, and many others of the original F.A.S.T. Club, have loaned the stooges, flags, and "know how" to help some clubs that want to sponsor this type of flying. The trophies are stock and don't cost enough to worry about, so the contests are not only a lot of fun but make money for the club treasury as well. If any of you club secretaries would like to get more information about Team Racing drop a line to Les McBrayer, 1238½ S. 2nd St., Alhambra, California.

* * *

Modelers all over the world are always looking for a new twist in modeling so tie into this one and see what you think. We've been talking for some months about a One Model Contest. In other words, one ship will be used for the whole meet. Here's the way it works. Events available for the contest would be: Free flight event, PAA Load, Cargo carry, stunt (u-control), speed (u-control), and possibly other events. Yes, it would have to be a plenty versatile ship. It would be permissable to use two stabilizers, one for free flight events and the other for the u-control events. As to the ship, let's pick out a cabin job similiar to the *Buccaneer*. This type of ship has plenty of inside area to house PAA Load men and cargo weight. This ship could compete in all events. Free flights would be a breeze as would the PAA and Cargo event. The stunt event could be a bit rough but by lifting the rear of the wing to zero incidence and adding the tail with elevators on it, you'd have a plane that would go through quite a bit of the pattern. Speeds would be anything but terrific but you would surely get a clocked time and wouldn't have to worry about getting out of a dolly. An event such as this could be run off in a fairly short time. All ships would have to go through the same flight sequence to make things more even. Start with the free flight events and wind up with the u-control flights. When some of you versatile builders get going on the project, let's hear from you and give us some of the results. This type of flying is just in the nature of a "trial balloon" at the present time but with the affirmative nods of heads that we've had so far in the "I'll try anything once" manner, the results should be noteworthy.

* * *

The Dallas *Cliff Climbers* Club and the Fort Worth *Aero Modelers Association* have gotten together, according to "Dub" McCormick, publicity man for the F.W.A.M.A. They have agreed to hold one contest a month instead of two as before. It seems that two clubs can stage a better meet than one. The wives of some of the flyers rebelled a bit about the old man flying two Sundays out of the month, so this also helped bring the boys together. The meet will be held the first Sunday of each month. Efforts of two or more clubs in sponsoring a meet have always paid off. Each outfit has members donate their time to help run the events and the prizes and merchandise payoffs are usually much better. Expenses being shared by each club don't take too much out of the club treasury.

* * *

Since the last war, everyone has become more air conscious. In England, the Royal Air Force Model Aircraft Association was formed in October, 1949. The post war development was reflected within the service, and it is the exception rather than the rule to find an R.A.F. station which does not have a Model Aircraft Club. Some of the smaller bases have just a few enthusiasts with the numbers growing to 30 and 40 in some of the larger outfits. At a last official count, the modelers in the Air Force numbered over one thousand. With the great number of flyers throughout the force, it was soon apparent that a central organization was needed to watch and coordinate the interest of the modelers. In 1949 the start of the Association was a bit unpromising due to the lack of finding a Third Party Insurance policy at a reasonable term. This policy had to have twenty-five thousand pounds backing. The policy was needed for model flying over the Air Ministry property at home. This privilege is now enjoyed by all members plus affiliation with the Society of Model Aircraft Engineers Ltd. for the sum of one shilling per month. The S.M.A.E. is the governing body for model aeronautics in England as is our own A.M.A. in (*Continued on page* 45)

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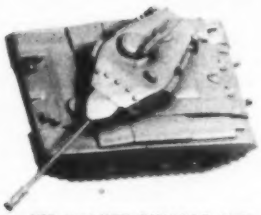

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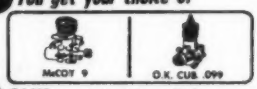

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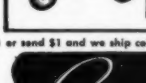

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20 YEARS AGO

You might not have been able to buy a gas engine twenty years ago but for 99c you could purchase a knock-down kit for a three-cylinder compressed-air motor. There was a gimmick, however. The tank cost $1.95 as a kit, or $4.75 ready to go. The more bewhiskered among us will never forget those tanks! Three inches in diameter, they came in two lengths: 24 or 30 inches! You rolled thin sheet brass into a tube, soldered the seam, then bound the whole thing with row after row of music wire. But don't laugh. Compressed air jobs spanned as much as six feet and were capable of respectable flights.

In those days, they practically begged you to take away lovely "white, wormless, polished balsa." A three-foot 1 x 3 was 18c, a 1 x 2 only 12c, a 2 x 3 only 30c. Maybe the cost of wood has skyrocketed over the past two decades but cement cost 15c for the tube.

A unique deal for making a model fly longer on rubber bands, was a "gearless prime mover for model airplanes," purported to give direct drive power with double the duration. This magic gismo featured three crankshafts and as many rubber motors, with a connecting rod joining the cranked sections of the shafts. It weighed only 1/25 of an ounce.

Highlight of the December 1931 issue was a two-page Cleveland Model & Supply ad, featuring 21 pictures of those scale jobs no old timer worth his salt can forget. The crates in the pictures were magnificently built, some posed against realistic backgrounds that, despite the time-yellowed pages, still make a balsa butcher drool. The Polish fighter, Curtiss *Jenny*, *DH-4*, Boeing fighter, the *Camel* and the *SE-5* would knock your eye out. There were real scale builders in those days, and these were real scale models. Spans ran about two feet, prices two bucks plus.

Scale and World War I were still the rage so the cover aptly showed a Nieuport and a *Camel* administering the coup de grâce to a German sausage balloon. Inside, the series of stories on W.W.I aces went on with that of Major Raoul Lufbery's, inventor of the Lufbery circle, a defensive maneuver in which friendly planes chased each others' tails. While modelers ate up the tales of a war gone some 13 years, another air war was but eight years away.

A Scrambled Picture Contest offered for first prize a 10-hour flying course, with a ground course and a 200-mile cross country flight (Casey Jones was to be the pilot) as second and third prizes . . . Edwin T. Hamilton took 12 pages to draw a rubber-powered Lockheed *Winnie Mae* . . . Gus Anderson rendered a detailed drawing of the Gee Bee *Supersporter*, the same job Les McBrayer modeled in this October 1951 M.A.N. A *DH-4* three-view rounded out the models.

Those were the days when all good model builders wanted to get into aviation. Lt. Miller was in the seventh installment of a series on airplane engines; Capt. Potter tied the score with his seventh on Aerial Radio. Ken Sinclair offered more of his course in Airplane Designing. "By mastering this valuable course, the model builder of today lays the cornerstone of his career as the aeronautical engineer and designer of tomorrow." How right they were!

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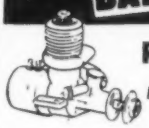

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ARE WE FORGETTING THE KIDS?

While other and bigger cities talked, Hutchinson, Kan., *Balsa Butchers*, American Legion, put over a beginner program that should make every model club take note.

by Beverly Baumer

Until Hopalong swaps his spurs for a F-80, he'll be as heroic as a dandelion to 72 Hutchinson, Kansas, kids.

These youths, known as the *Junior Balsa Butchers*, find the drone of model planes more fascinating than whooping Hollywood cowhands. They're learning to build and fly model ships professionally —and the training costs them nothing. The props they break, the ships they shatter, the fuel they burn, are all paid for by the American Legion and the *Senior Balsa Butchers*, a model plane organization for adults.

So successful is the project that youngsters take better dressed report cards home, squirm on piano stools longer—just for permission to attend Balsa sessions.

But who put such a program in flight, and why? It all began when Hutchinson's *Senior Balsa Butchers* gathered for a Sunday afternoon field day.

As one member put it: "We realized there was a need for training young boys to be able to fly so they could enjoy this interesting hobby. The Balsa Butchers felt that in their day there was no training program available and it was just a hit or miss deal with them. Often they would take their ships out the first day and crack up. This was why we wanted young boys to learn. Then they wouldn't have to go through such discouragement."

Sometime after organizing, Senior BB's called on civic organizations all over town and explained their proposed program, which was to be set up for all youths eight to sixteen, regardless of race, creed or financial status. The only requirement for admission was parental consent.

Junior and Senior *Balsa Butchers* gather for a lesson in plane construction. At one meeting 35 youths started work on a glider; 17 showed up on a shivery day for a lesson in flying. Each senior takes two juniors in tow. After graduation, each pupil becomes teacher, trains two others.

Left—Large sponsor that helps kids in big way is Plymouth. Two young 'uns here learn about drop-off gear on speed jobs.

About a dozen boys attended the first meeting. Then Senior members swept into action. They hustled up 12 motors for the youngsters, finished work on a dozen model kits, and contacted the American Legion for financial aid. They received immediate assistance.

Hutchinson's prairie pilots are given two units of training—model building and flying. The kids spend spring and summer in the field. During blustery winter days they tend plane construction tables, hear discussions on aerodynamics, and view travel movies supplied by Continental Air Lines.

Each Senior member is responsible for training two Juniors. While learning to fly, the boy is first shown the proper way to put a ship in the air, then is later permitted to operate the controls with his instructor. This is repeated until the youth no longer needs help.

Confident his trainee can man the ship without assistance, the adult steps out of the circle, leaving the lad completely on his own. Some youths can master the controls in just two trials. Others require as many as ten attempts. During the first four weeks of the program students wrecked the number one training ship 13 times.

After a boy completes six solo flights, he is "commissioned" a pilot and silver wings are pinned to his shirt. The ceremony is accompanied with as many gulps as a parachutist's first plunge.

In addition to silver wings (furnished in replica by Continental Air

Five junior *Balsa Butchers* await instruction. Fuel and props are free. When boy earns membership card he stands personal flying costs from his own pocket. Instruction is given in rubber, gliders, control line, and free flight. Outdoor work scheduled for good weather, indoor activities in winter.

Above—Teaming up on construction job are Bob Stone, left, and Freddie Williams, right. At present 75 cadets are enrolled, 35 to 45 attend meetings regularly.

Right—Freshman speed demon at *Internats* uses power starter. Last year in Hutchinson, 26 boys "graduated." Club holds special contest for every ten.

Lines) the successful operator is granted a club membership card entitling him to all privileges as a Balsa Butcher. He then becomes a teacher and sets out to train two other boys. From that day on, all personal flying costs must come from his own billfold, for he is no longer a novice.

The average kid would rather spend his training period flying, but Senior members feel he should also know how to construct a ship. Students are taught to build four different planes—simple gliders, rubber powered crafts, control liners and free flights.

At one meeting 35 youths started work on glider models. All but three finished their ships within a few sessions. When the project closed, 17 boys reported on a shivery winter day for a lesson in glider flying.

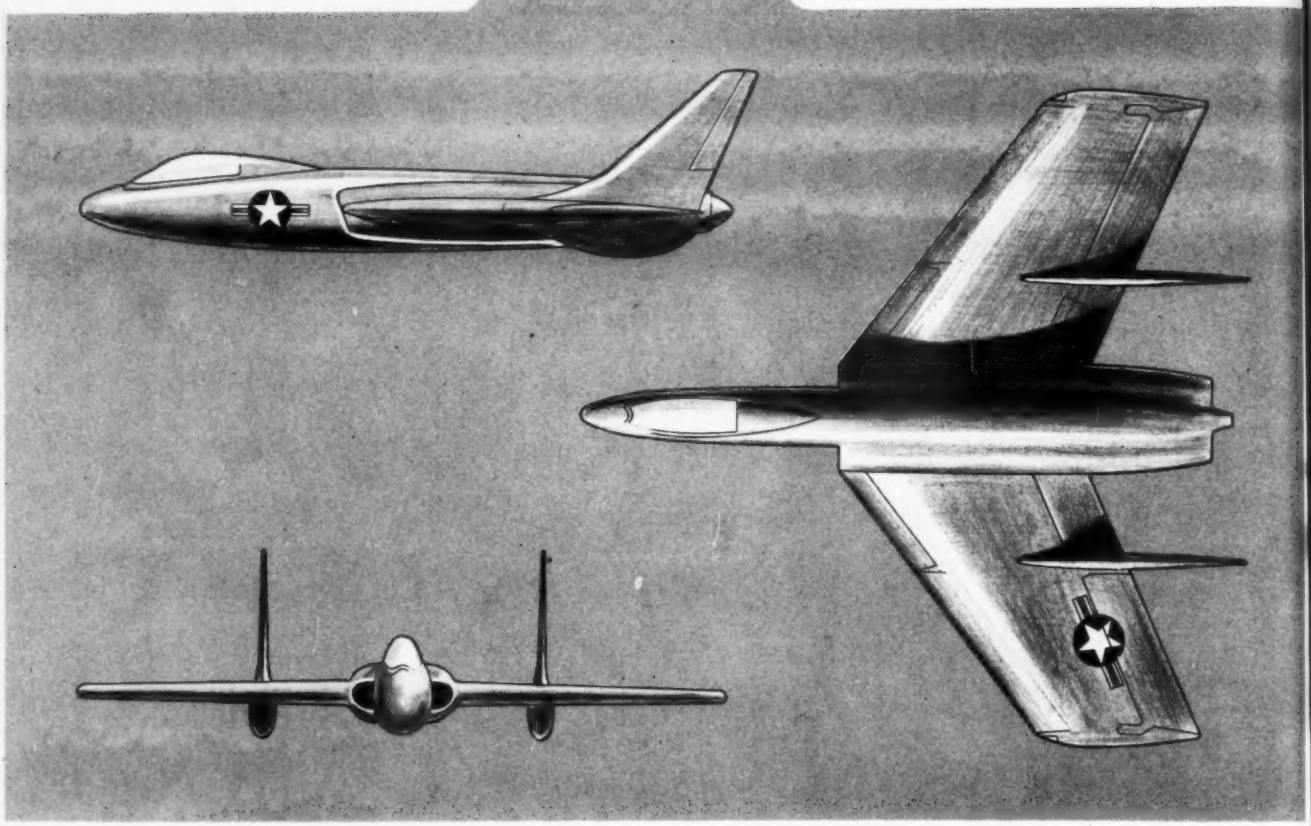
Every step in plane building is supervised by the instructors, who see that parts are cut out correctly, cemented together properly, and the finished craft is pitched accurately.

Last year 26 boys completed all phases of the training program. After ten youths become licensed pilots, the club holds a contest for them. A prize is given for the best take-off and landing, another for the best all-around flying, and one for the best crash, if any.

At present, 72 cadets are enrolled for training and 35 to 45 attend regularly.

Hutchinson's Junior flying program may lack Rickenbacker glamour, but it's "washing out" delinquency.

No. 17—Vought Cutlass



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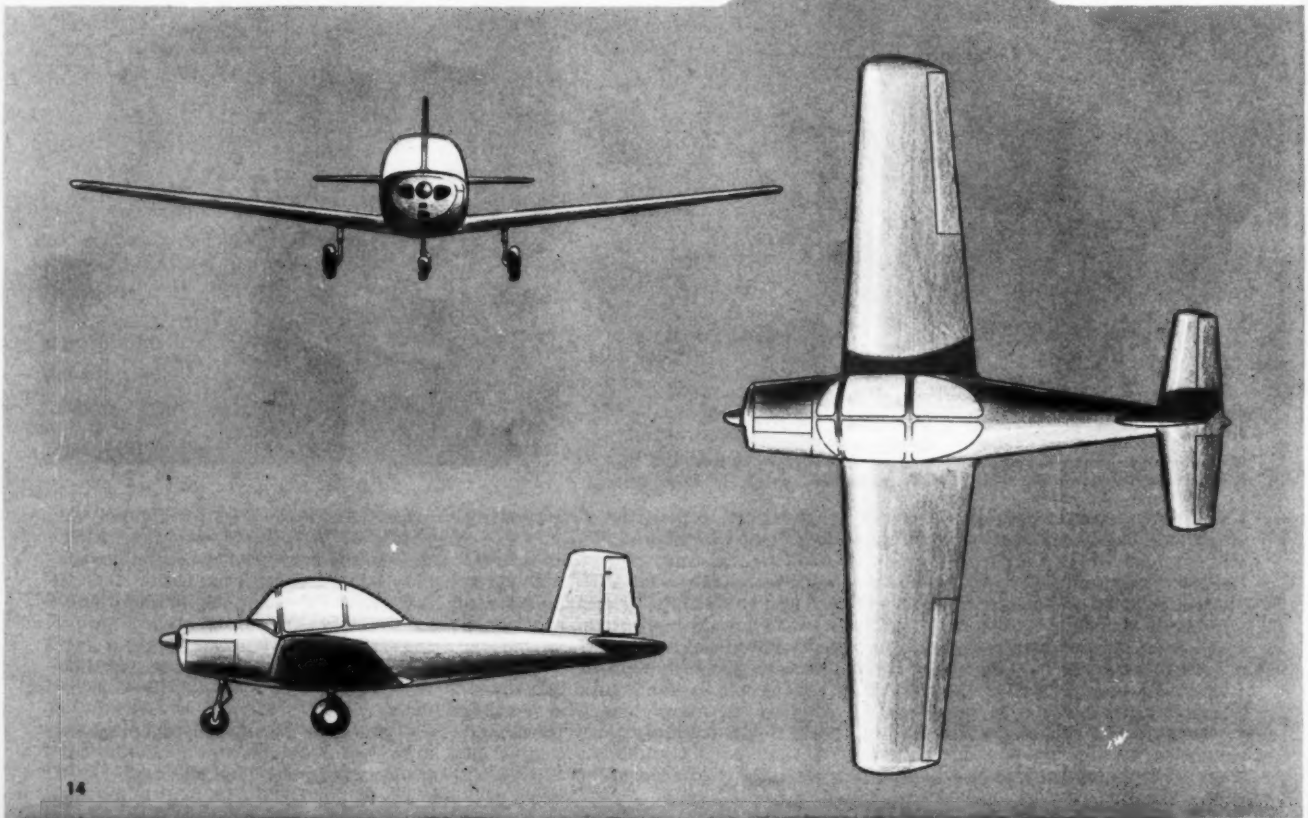


by David Anderton

Britain's second four-jet bomber, Avon-powered Short SA/4. Below — Team and scale fans can do things with this outline of top '51 racer.

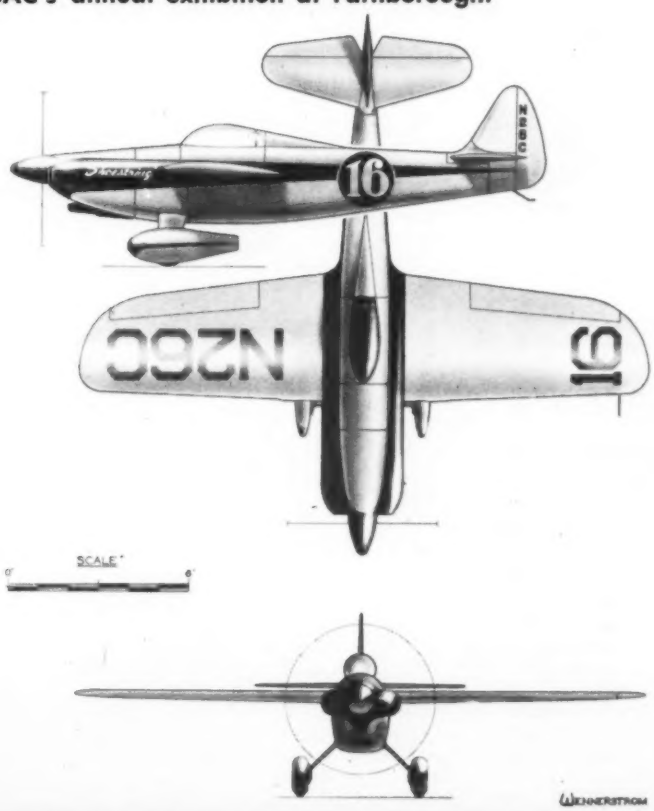
PLANES IN THE NEWS

Traveling in Europe, MAN's aviation correspondent reports this month on latest military aircraft seen at SBAC's annual exhibition at Farnborough.

Farnborough, England—A sleek, pale-green jet fighter—the British Hawker P.1067—has been consistently breaking the world's speed record at public demonstrations of this twelfth Society of British Aircraft Constructors exhibition. The plane, which has been called the fastest fighter in the world, is living up to advance claims made for it. There is no question in my mind about it, either—the plane is red-hot. And if its flyby speed is matched by the rest of its performance capabilities, the Royal Air Force will in truth have the greatest fighter in the world.

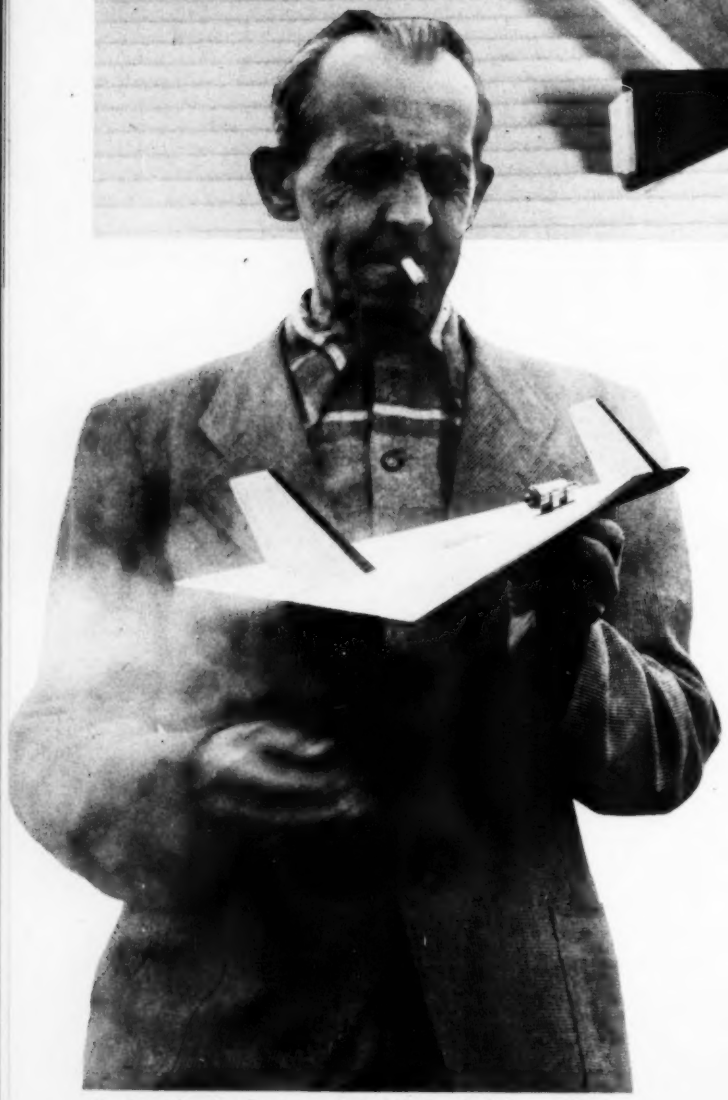
The P.1067 is a Hawker development in a series of jet fighters that started in the postwar years. Hawkers first brought out their P.1040 with straight wings, conventional tail surfaces, and a split inlet and tailpipe, for the Rolls-Royce Nene jet engine which powered the craft. It is basically this P.1040 which has become the Royal Navy's *Sea Hawk* and is in service. By sweeping the wings back, Hawker changed the P.1040 into a P.1052, which was demonstrated here also in Naval colors. One step further found the tail surfaces swept as well, and the result was the P.1087 which created a sensation at last year's SBAC show in the capable hands of the late "Wimpy" Wade.

But the new P.1076 is more than a development; it is a completely new aircraft, at least so far as anyone can judge. The engine is the Rolls-Royce Avon, big 7000-plus lb. thrust turbojet. And Hawker people hint that a different type of structure has been used in the plane. In line, it resembles the P.1081 somewhat, but is longer because of the Avon. This length gives it increased sleekness, which has been (*Continued on page* 44)



Above—This model with the Jetex mounted underneath did not perform as well as models with the power unit installed on the top.

DR. LIPPISCH'S deltas



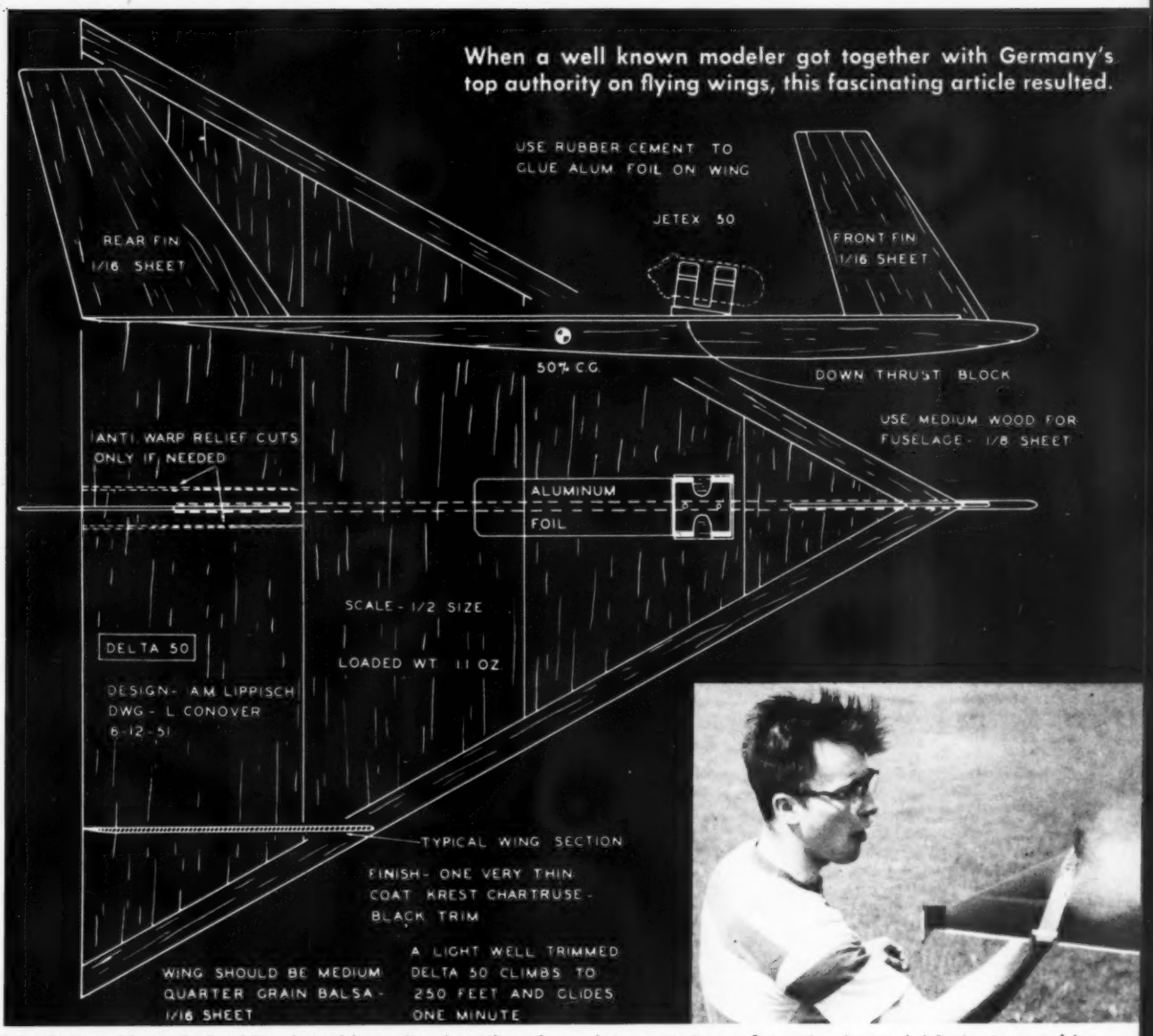
Nearly a decade after tests of *Me-163*, Dr. Lippisch experiments with *Jetex* deltas. A front fin was found to prevent spiral dives.

by Dr. A. M. Lippisch and Lawrence Conover

▶ Our first *Jetex* delta wing model—a balsa framework covered with *Silkspan*—was flown late in 1950. The *100* flew it quite well despite a wing area of 175 square inches and a weight of three ounces. During the winter of '51 we flew a *Jetex 350* powered delta with a 24 inch span. It was a hot airplane, many of the flights being either loops or series of vertical banks.

Early in the spring we started building with vigor. An early model of the *Delta 50* was cut from 1/8 sheet balsa. It was heavy but very consistent. High fins were used on both tail and nose. We found that one of the best stability features on our delta wing models was the front fin. It keeps the nose up in a bad turn.

We had been using normal fins mounted on the center line of the fuselage but had never tried tip fins. I checked with Dr. Lippisch on this and it seemed that they might be an advantage. He had used them on the rocket models as early as 1928. We blamed some of our present stability problems on tip stalling because of the pointed wingtips. The result


When a well known modeler got together with Germany's top authority on flying wings, this fascinating article resulted.
USE RUBBER CEMENT TO GLUE ALUM FOIL ON WING
JETEX 50
REAR FIN 1/16 SHEET
FRONT FIN 1/16 SHEET
50% C.G.
DOWN THRUST BLOCK
USE MEDIUM WOOD FOR FUSELAGE - 1/8 SHEET
ANTI WARP RELIEF CUTS ONLY IF NEEDED
ALUMINUM FOIL
SCALE - 1/2 SIZE
DELTA 50
LOADED WT 11 OZ
DESIGN - A.M. LIPPISCH
DWG - L. CONOVER
6-12-51
TYPICAL WING SECTION
FINISH - ONE VERY THIN COAT KREST CHARTRUSE - BLACK TRIM
WING SHOULD BE MEDIUM QUARTER GRAIN BALSA - 1/16 SHEET
A LIGHT WELL TRIMMED DELTA 50 CLIMBS TO 250 FEET AND GLIDES ONE MINUTE

Delta 50. **Part of longitudinal stability obtained by sanding the trailing edge on bottom only for a reflex section. Increased deflection is warped in during tests. The author waits tensely to launch the *Delta 100* job. Note the control vane (effective under power) similar to that of the V-2 rocket.**

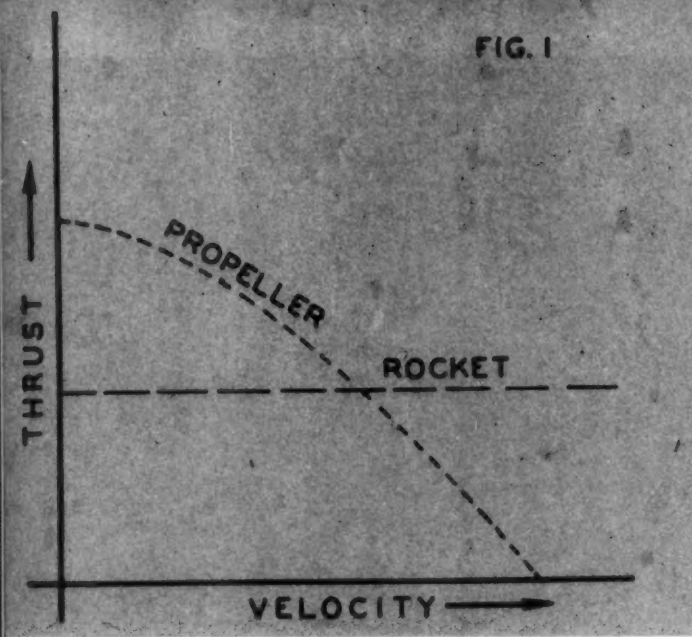
of this discussion was an ultra light model designed for the *100*. To make construction easier we decided on simple flat-bottomed airfoil sections. The finished model had large kite-shaped tip fins, and a long nose with a profile cabin. First the nose broke off when it looped in. We trimmed it and retained a short fuselage. Many stability problems showed up because the model was overpowered. The motor was mounted on the bottom of the wing causing extreme nosing up tendencies. There was too much fin area in the rear. The motor was moved to the top of the wing and the lower half of each tip fin was cut off, leaving all the lateral area above the center line (except the fuselage). The celluloid profile cabin was removed and a large front fin added in its place. The model didn't loop but it did beautiful slow rolls. Sometimes it didn't roll all the way around but just paused inverted, then recovered in an upside down immelman. Fun to watch but it didn't provide much altitude or duration. "Too much fin in front," Dr. Lippisch said.

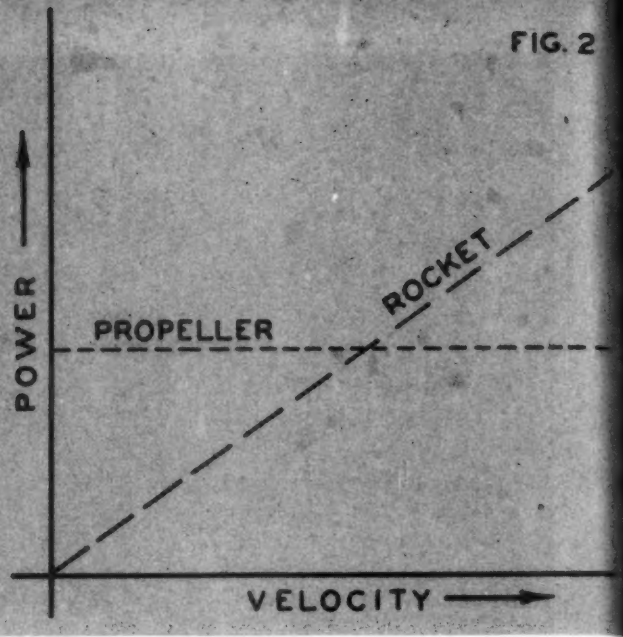
We cut some front fin off and the rolling stopped, but the delta used the last five seconds of power in loops. We could see that with the *Jetex* placed in front of the C.G., the model assumed a nose heavy attitude when loaded. When most of the fuel had burned and the extra power of the last part of the run took over, the low angle of climb changed quickly to well-executed loops. How could we control this over abundance of power?

Dr. Lippisch explains this phenomenon.

"Everybody who tries to fly a model with rocket propulsion will be quite astonished to see that even with a thrust of one ounce or less the model seems to be overpowered. If you adjust the model for a nice, steady, flat glide the flight with thrust will end up in continuous loops or tight spirals. To get the model into a good safe climb you have to adjust it so that the glide without thrust is much steeper and faster than you would like. By doing this you would diminish the looping tendencies but the total duration of the flight would be cut down. You might wonder what causes this unusual behavior. Let's explain this a little bit.

"Your *Jetex* rocket engine produces thrust by throwing out the burned fuel as hot gases with high velocity (about 1200 feet per second). Since this thrust is then produced by an internal combustion where no outer air is needed,





At low speeds gas engine and prop give large thrust but at some speed prop gives no thrust. Constant thrust rocket becomes efficient at high speed.

the thrust of a rocket engine is independent of your flight speed. That means you have an engine with constant thrust. The power is Thrust Velocity and so the faster you fly the more power you have available. You reach a practical limit in the atmosphere because of air resistance. The power of the gas engine depends on the rpm's you have and once turning at top revs it will give only a fixed amount of power. The thrust of the prop is therefore decreasing with the increasing velocity of the model.

"Figure One should give you an idea of the thrust characteristics of a gas engine and a rocket engine. At the lower speeds the gas engine and propeller give a large amount of thrust, but there is some high speed limit where the prop ceases to give thrust. So for best efficiency you choose a prop which is in accordance with your flight speed. With the rocket engine you have at any speed the same thrust. Therefore when your *Jetex* puts out only one ounce of thrust at low speeds and high angles of attack the power is low. But the faster you fly the more efficient the rocket engine becomes. The thrust remains the same but the speed keeps increasing. This is somewhat like coasting down a big hill. The thrust is gravity and its force remains the same all the way down. However you keep accelerating during the entire run and at the bottom of the hill you are moving much faster than when you started.

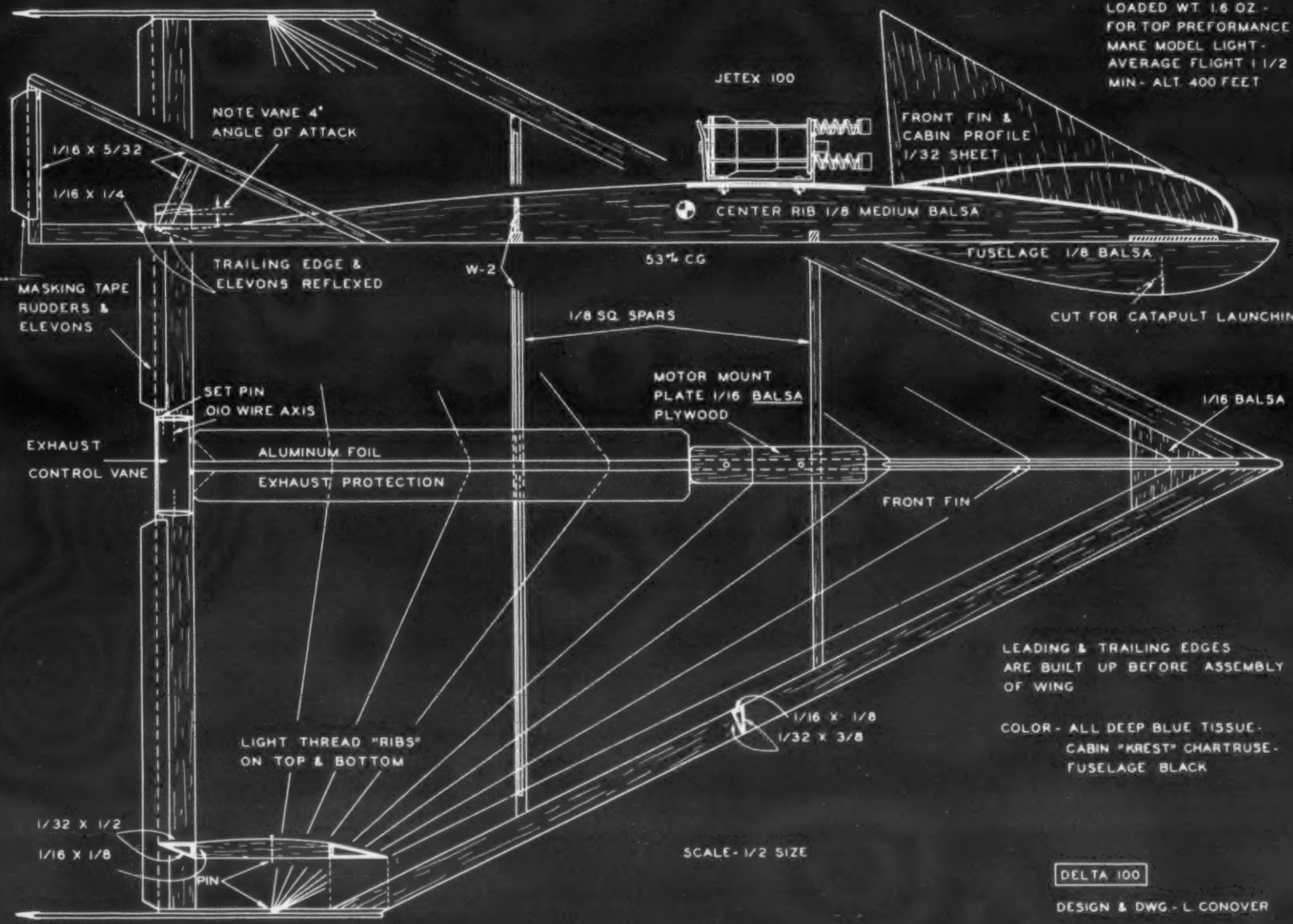
"Figure Two is the power-velocity diagram. It shows that at zero mph the rocket engine has no power, because it is doing no work. The gas engine is working at this point because the propeller works on the air and gives static thrust. Calculations show that at 50 mph the *Jetex 100* has 1/120 hp. At 6000 mph it would develop one hp. Power is thrust times velocity."

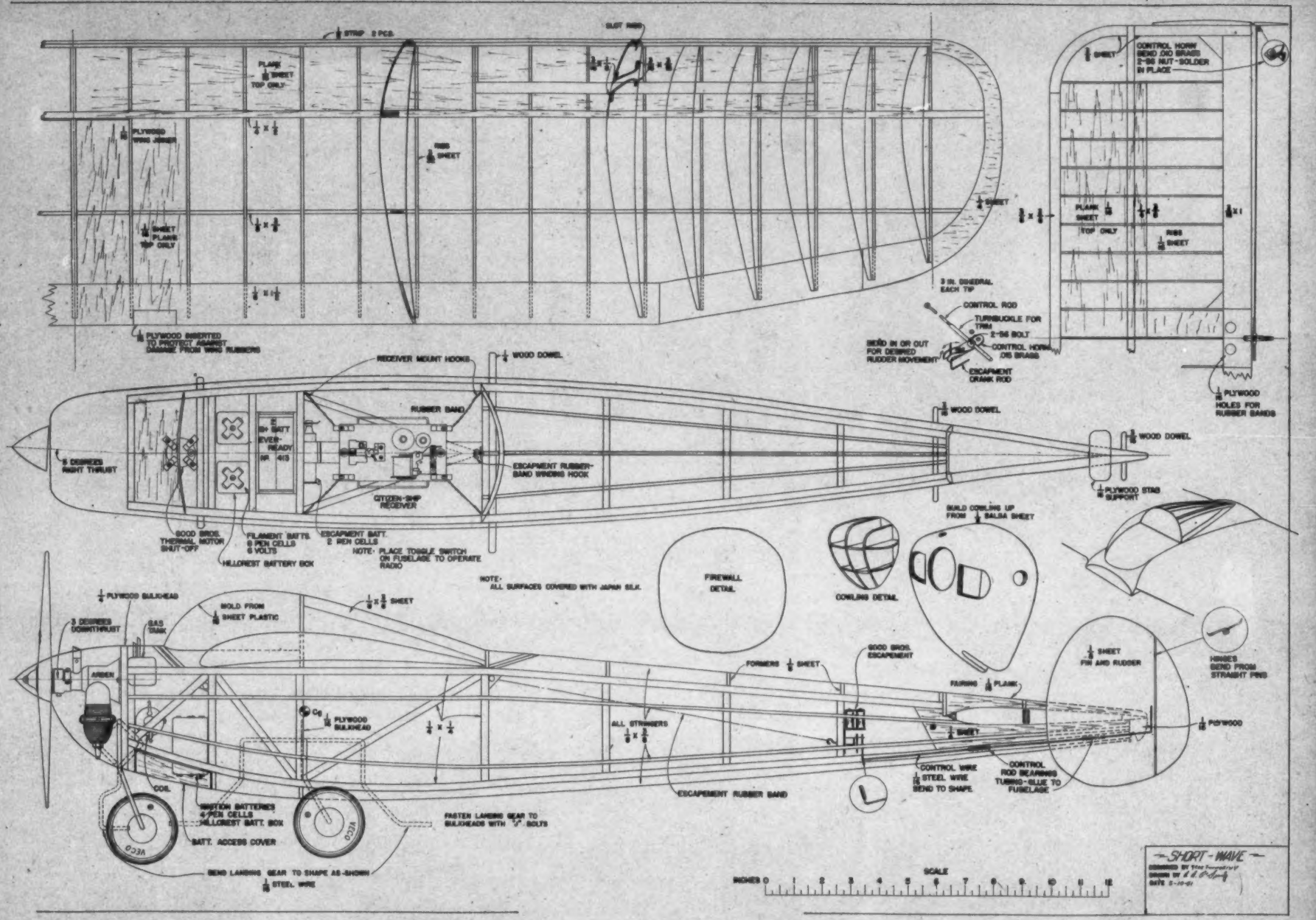
The trick to successfully fly a rocket model is to adjust the power-on flight for high speed and the power-off part for low speed and best gliding. There are a number of ways to accomplish this. You must suit the method to a particular design of airplane since each has special flight characteristics. Downthrust is one of the easiest ways. Remember that the C.G. is the axis for all thrust adjustments. With the motor mounted in front of and above the C.G. the exhaust must have an angular deflection upward. A similar effect can be obtained by raising the *Jetex* higher above the centerline. This introduces a pitching moment forward and down. If you want to get fancy you can use the method we did in the *350* model. We mounted the engine on a sliding platform under the wing. When the rocket pushed forward, engine and platform slid ahead on small runners. This moved the C.G. in front to a position where looping was prevented. Rubber bands with just the proper amount of tension pulled the unit back as the power stopped and the model went into a normal glide. This high powered delta climbed to 1000 feet directly into the wind with this arrangement.

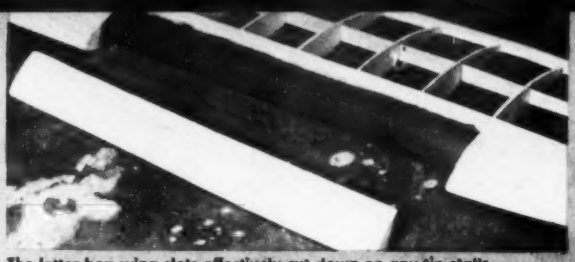
Another effective method of power control is the exhaust vane. We tried this first on the *Delta 100*. The idea actually dates back to early rocket experiments in Germany. The control vane is useful only while the exhaust stream is flowing over it. The air is moving at a high velocity over the small surface and creates a strong tail lifting force. When the rocket stops blowing, the vane has very small lift and allows the ship to glide properly. The angle of incidence of the control vane can be varied to meet the requirements of the model.

One of the very important things we found out was the effect of Reynolds Number on some of these small models. RN is a proportional measurement of the effect of air moving around a surface. The size of the model and its velocity determine this number. Our delta wing models attain fairly high RN values for models because the wing chord is large and the rocket provides speed. Ordinarily you don't pay much attention to this factor on your models. We found that there are special times when you must. We had troubles adjusting the lighter models for the *Jetex 50* but we attributed this to the flat-plate section of the sheet balsa wing. They also seemed to be overpowered. The real trouble showed up when we decided to test a new model of the *Delta 100*. We installed the *50* so that it would be easier and safer to check out for adjustments. The new model had a few experimental changes. The leading edges were thicker and more rounded. High tip fins were used. Our problem started with the first glide. The nose kept plowing into the ground. Finally by taking out some warps and using our standard full length elevons the nose came up. But it didn't stop. Now all the thing did was stall.

No matter what we did it either stalled or nosed in. It wouldn't even fly on its back, which had happened on some earlier models. First we suspected the rounded leading edges. We knew that their shape was a problem on full-scale delta wing aircraft. We tried the most sensible thing and sharpened them with masking tape additions. No good! It still executed that beautiful slow approach stall so characteristic with delta wing designs. We tried turbulator strings on the wing, and turbulence wires in front of the wing. (*Continued on page* 51)


LOADED WT. 1.6 OZ -
FOR TOP PREFORMANCE
MAKE MODEL LIGHT -
AVERAGE FLIGHT 1 1/2
MIN - ALT. 400 FEET
JETEX 100
NOTE VANE 4°
ANGLE OF ATTACK
FRONT FIN &
CABIN PROFILE
1/32 SHEET
1/16 X 5/32
1/16 X 1/4
CENTER RIB 1/8 MEDIUM BALSA
FUSELAGE 1/8 BALSA
TRAILING EDGE &
ELEVONS REFLEXED
W-2
53% CG
MASKING TAPE
RUDDERS &
ELEVONS
1/8 SQ. SPARS
CUT FOR CATAPULT LAUNCHING
SET PIN
.010 WIRE AXIS
MOTOR MOUNT
PLATE 1/16 BALSA
PLYWOOD
1/16 BALSA
EXHAUST
CONTROL VANE
ALUMINUM FOIL
EXHAUST PROTECTION
FRONT FIN
LEADING & TRAILING EDGES
ARE BUILT UP BEFORE ASSEMBLY
OF WING
1/16 X 1/8
1/32 X 3/8
COLOR - ALL DEEP BLUE TISSUE -
CABIN "KREST" CHARTRUSE -
FUSELAGE BLACK
LIGHT THREAD "RIBS"
ON TOP & BOTTOM
1/32 X 1/2
1/16 X 1/8
PIN
SCALE - 1/2 SIZE
DELTA 100
DESIGN & DWG - L. CONOVER


STRIP 2 PCS.
SLOT ROD
PLANK SHEET TOP ONLY
PLYWOOD WING JOINER
RIB SHEET
SHEET PLANK TOP ONLY
PLYWOOD INSERTED TO PROTECT AGAINST DAMAGE FROM WING RUBBERS
CONTROL HORN BEND .010 BRASS 2-56 NUT-SOLDER IN PLACE
3 IN. DIHEDRAL EACH TIP
CONTROL ROD
TURNBUCKLE FOR TRIM
2-56 BOLT
CONTROL HORN .015 BRASS
BEND IN OR OUT FOR DESIRED RUDDER MOVEMENT
ESCAPMENT CRANK ROD
PLYWOOD HOLES FOR RUBBER BANDS
RECEIVER MOUNT HOOKS
WOOD DOWEL
RUBBER BAND
2+ BATT EVER-READY NR 415
ESCAPMENT RUBBER-BAND WINDING HOOK
CITIZEN-SHIP RECEIVER
6 DEGREES RIGHT THRUST
PLYWOOD STAB SUPPORT
GOOD BROS. THERMAL MOTOR SHUT-OFF
FILAMENT BATTS. 6 PEN CELLS 6 VOLTS
HILLCREST BATTERY BOX
ESCAPMENT BATT. 2 PEN CELLS
NOTE- PLACE TOGGLE SWITCH ON FUSELAGE TO OPERATE RADIO
NOTE- ALL SURFACES COVERED WITH JAPAN SILK.
FIREWALL DETAIL
COWLING DETAIL
BUILD COWLING UP FROM BALSA SHEET
PLYWOOD BULKHEAD
3 DEGREES DOWNTHRUST
MOLD FROM SHEET PLASTIC
GAS TANK
ARDEN
FORMERS SHEET
GOOD BROS. ESCAPEMENT
FAIRING PLANK
SHEET FIN AND RUDDER
HINGES BEND FROM STRAIGHT PINS
PLYWOOD
ALL STRINGERS
CONTROL WIRE STEEL WIRE BEND TO SHAPE
CONTROL ROD BEARINGS TURNING-GLUE TO FUSELAGE
ESCAPEMENT RUBBER BAND
COIL
IGNITION BATTERIES 4 PEN CELLS HILLCREST BATT. BOX
BATT. ACCESS COVER
FASTEN LANDING GEAR TO BULKHEADS WITH 1/2" BOLTS
BEND LANDING GEAR TO SHAPE AS SHOWN
STEEL WIRE
SCALE
INCHES 0 1 2 3 4 5 6 7 8 9 10 11 12
SHORT-WAVE
DESIGNED BY Vito Tangredi
DRAWN BY A. A. McCarthy
DATE 8-10-51



The letter-box wing slots effectively cut down on any tip stalls.

SHORT WAVE

Background—"Foxy" poses typical hand-launch technique. McNabb Citizenship-band radio was used.

Below—Not unlike the *Ercoupe*, *Short Wave* has twin tails; same power and glide turn traits.

The winner of the 1950 Nationals RC event presents a nifty sport model design with a contest type performance.

by E. R. FOXWORTHY

Most people familiar with R.C. will remember our old design, the Hoosier *Hot Shot*, and those who have seen the *Hot Shot* fly will remember it for its smooth performance. We have flown many types of R.C. ships, from Walker's *Hot Rod* to the *Rudder Bug*, and have never found any that compare in all around performance with the *Hot Shot*. The *Hot Shot* incorporated design features never before seen in R.C., such as twin rudders and NACA slots.

The *Hot Shot* was too stable. That statement may sound fantastic to the R.C. builder, but it is a proven fact that the *Hot Shot* could be placed in full rudder either way and never spin. It was as near a perfect example of C. H. Grant nose-up in turn design as had ever been seen. This stability was a disadvantage in contest work for any type of violent maneuvers. At the 1949 Nationals we found it impossible, even through the use of radical rudder trim, to make the *Hot Shot* spiral—thus losing enough points to come in a poor fourth.

Along with the aforementioned facts, the *Hot Shot* was large, light and slow, making a poor showing in windy weather.

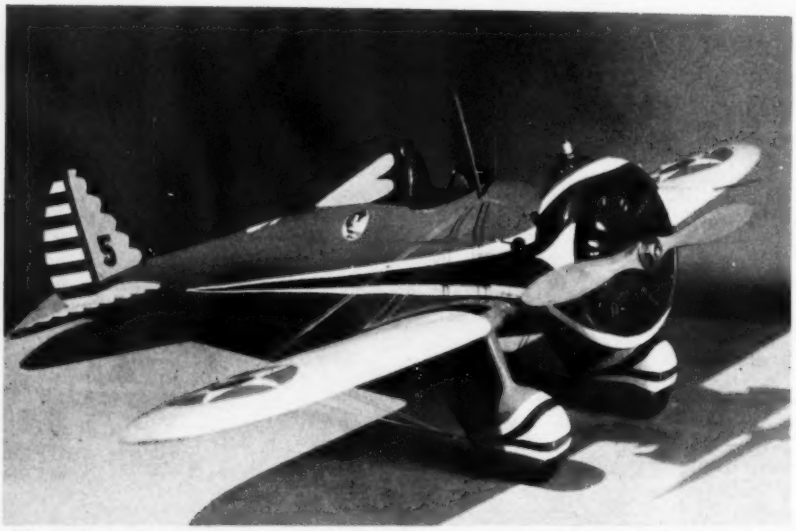
In the design of the *Short Wave*, we have attempted to improve on the weaknesses of the *Hot Shot* and to add some new features. The *Short Wave* is a shoulder wing design, having high thrust line and low center lateral area. We have always been students of C. H. Grant and our force arrangements are, as nearly as possible, according to the book.

Short Wave incorporates a low, sturdy tricycle gear which is essential (*Continued on page* 48)

Vampire jet arouses the interest of spectators at the Festival of Britain Model Flying Championships. More pictures from this interesting meet will be found at the bottom of opposite page.

air ways

FOR VARIATIONS IN TASTE YOU'LL NEVER SEE A MORE RARE SELECTION THAN THIS.

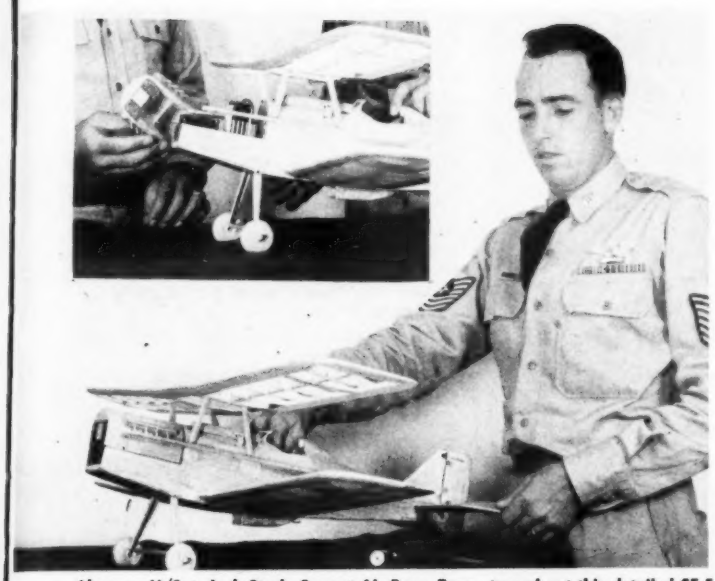


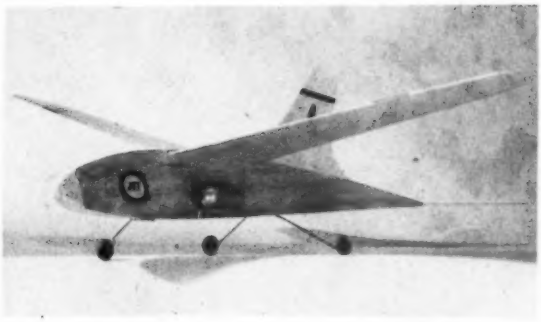
This month's $10 first prize winner: Boeing *P-26A* by Jerry Ellison, Ephrata, Washington. Power is a Forster .29, scale one inch to the foot, making a span of 27 inches. Took nine months.

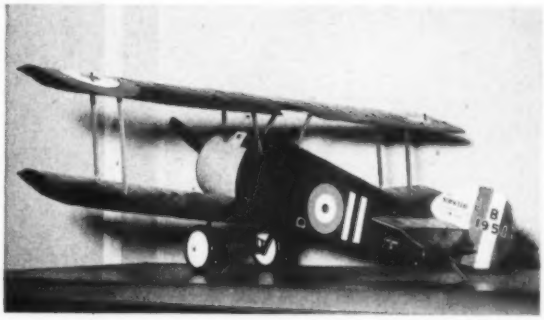
Second place subscription winner: Jack Elem's (Fullerton, Calif.) pretty Mac .29, team racer.

Mustang from Berkeley kit, by John Gee, College Station, Texas, proved wonderful flier. Used O & R .23. Note the working wing flaps, four-blader. John is a member of Texas Aggie Model Club.

Reverse delta Fox .35 stunter, Robert Seigelkaff, mgr. Koklis Kraft Shop, Anchorage, Alaska.



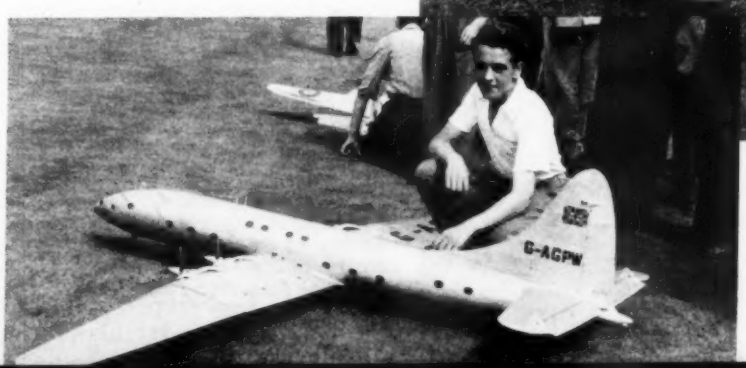




Above — M/Sgt. Jack Stack, Sewart Air Base, Tenn., turned out this detailed *SE-5*. Has full cockpit controls, and prop turned on by a battery-driven motor. Top right — Lloyd Hunt's (La Mexa, Calif.) tricky looking twin *Jetex* speedster. Right — Third place subscription winner, *Camel*, Bergen Hardesty, Frankfort, Ind.

DH *Beaver*, by Polish builder T. S. Nachtman, Elfin 1.8 Diesel, gorgeous flier. Doors, cockpit details, adjustable pitch propeller. Has 54 inch span, won one of biggest British meets.

Right—Control line *Flying Fort*, Albert Briggs, on four E.D. Mk. 4 Diesels. Flying surfaces detach for ease of transport. Good detail.



Left — Bristol *Brabazon*, by W. P. Holland. It is powered by four Elfin 1.8 Diesels. Flies well.

by
DON
GROUT

John Corey, who built the long-span second model for this report, displays the author's silvered ST built exactly according to the kit. Both these ships were powered by the new K & B. 29.

we test THE RYAN S.T.

Sterling's Ryan ST will make you forget it is a model as it does wingovers, loops, other maneuvers, says the test pilot of this new detailed flying scale kit.

On the right is the exact model; on left, the larger-winged version dreamed up by author to compare true scale with a stunter. The ST was almost as good! Loops, eights, inverts easily.

Realism is an appealing thing in all models. The object in flying models from the beginning has been to simulate the real thing in miniature as closely as possible, both in looks and movement. In many cases one or the other must be sacrificed, as witness the beautifully finished scale ships that crack up on the first flight or lob around like a wounded duck. Or the diminutive barn doors that will turn inside out but remind you of just what they are, a stunt job. The ideal model and one with the greatest universal appeal, is the one that makes you hold your breath and almost forget it's a model as it executes wingovers, loops and other maneuvers.

Sterling Models, Philadelphia, Pa. has been a leader in the scale gas model field for a long time with such kits as the *Mr. Mulligan*, *Monocoupe* and Howard *Pete*. However, their latest models have been selected and designed not only as to scale but also flyability. The SE-5 and now the Ryan *S-T* are designed for the ideal in miniature realism.

Sterling kit construction has remained very much the same from way back which is the proof of good designing. They are designed for simplicity of building, light and rugged construction and stack up with the best of the prefabs.

The Ryan *S-T* is a scale control line of Ryan Aeronautical Company's sport trainer and has been designed for Class B and C engines. The wing span is 36", chord 5-1/2" and length 26". The kit contains die stamped parts; shaped and notched, solid leading and trailing edges; formed landing gear; *Silkspan*, decals, windshields, full size detailed plans and a one piece metal cowl for a completely cowled engine.

The scale model fan will be more than satisfied with the finished ship and will still have flyability. For the extreme stunt enthusiasts, we took the liberty of building up two models for "We Test" instead of one. The first was built by the author strictly from the plans. The second by John Corey, a stunt contest winner in these parts, was built with a slightly enlarged wing and full length flaps.

Let me say here, don't enlarge the wing if you want a scale flyer. Build it just as it was designed. Our flying tests proved it will execute smooth loops, eights, inverted flight, and hold out overhead if you use the space allotted by AMA for maneuvers. It lacks only on the corners of square loops in sharpness and on tight maneuvers, as compared with full-fledged stunt models. Explanation of the changes made in John's enlarged wing version will come later. It did not change the looks of the ship to any great extent, having only a 40" span and a 6-1/2" chord. The full flaps took in the landing flap and aileron in one piece but it tightened up the flying performance. It executed snap loops and tight corners along with the best of them which should readily satisfy the strictly stunt boys.

Per the plans, the ship was designed

around the K & B *.29* and that is what we used. Although larger and smaller engines would very easily fly the Ryan, it was felt a *.19* might lack power for stunting and excessive speed might result with a *.32* or larger. As it proved, the *.29* was an excellent choice. *Supersonic 100* fuel and a *Top Flite* 10-6 prop on 60' lines proved a good combination. There are some commercial tanks that will fit. However, the tank described in the plans takes the best advantage of the tank space for maximum fuel capacity and straight draw to the engine. We made this tank and it worked fine. The Ryan is a smooth lined, snappy looking ship when finished and warrants a good paint job. Even with disregard for additional weight in painting, it only weighed in at 1 lb. 11 oz. complete with wheel pants, trim and engine.

The Sterling construction lends itself very well to that of the original ship which was metal throughout, fabric covered wings with metal sheeted leading edge and included landing flaps. The model's construction is built on a center crutch or deck with top and bottom bulkheads glued in properly spaced notches. Ten basic full length stringers fit into die stamped notches; the outer skin is sheeted and the wings are covered with *Silkspan* or silk. The sheeting is handled in sections which forestalls trouble with compound curves and other complications. The plans include a full size pattern for each section of planking. By fitting each section before cementing permanently, putting cement on bulkheads and stringers of that particular section and pressing the sheeting into place, it marks the contact points to be cemented on the sheet. Let me emphasize one point in the instructions, to wet the outside of the sheet. A paint brush does the job well. Use plenty of pins. Model pins are much smaller than regular size and help to keep from splitting the sheeting. One of the first sections to be covered is that sheet under the wing as it is the most difficult to fit well. Also the section including the cockpits is more easily put on without cutting out the cockpit holes until it is dry.

The plans are very good, having step-by-step instruction with detailed drawings of parts that might have questionable construction.

Before assembling ribs, slide them on the main spar and sand even. Also ribs one and two can be cut down 1/16" on each side and the sections of sheeting can be cemented on top. By so doing, we found it easier to fit and keep the air foil. It was also easier to leave No. 1 and No. 2 ribs off the spar until they are cemented permanently. At that time, cut out the bottom of the spar notch, slip over and cement in place. Sand the leading and trailing edges to fit the contour of the ribs before assembling. Mark the rib positions on the main spar from the leading edge. Put plenty of cement all around the landing gear wire when bolting it on. (*Continued on page* 58)

Three-view drawing indicates how closely the *ST* kit follows the outlines of the real Ryan.

Construction features a keel or deck to which top and bottom bulkheads attach. Ten stringers. Plans rate high, with good step-by-step construction and detailed drawings of the tough parts.

half wild goose

Side view reveals installation of Spitfire timer, K & B .049, and ten degree downthrust which gives the ship its climb. Dethermalizer fuse, rear.

Victory smile! Jon Taft, Salt Lake City, after winning Utah Plymouth meet and setting A.M.A. state record. Uses a Tornado 6 x 3 prop.

by Barney J. Taft

During 1950 this extraordinary AA free flight model won eleven firsts, including its event at the Nationals. Features a straight ahead climb.

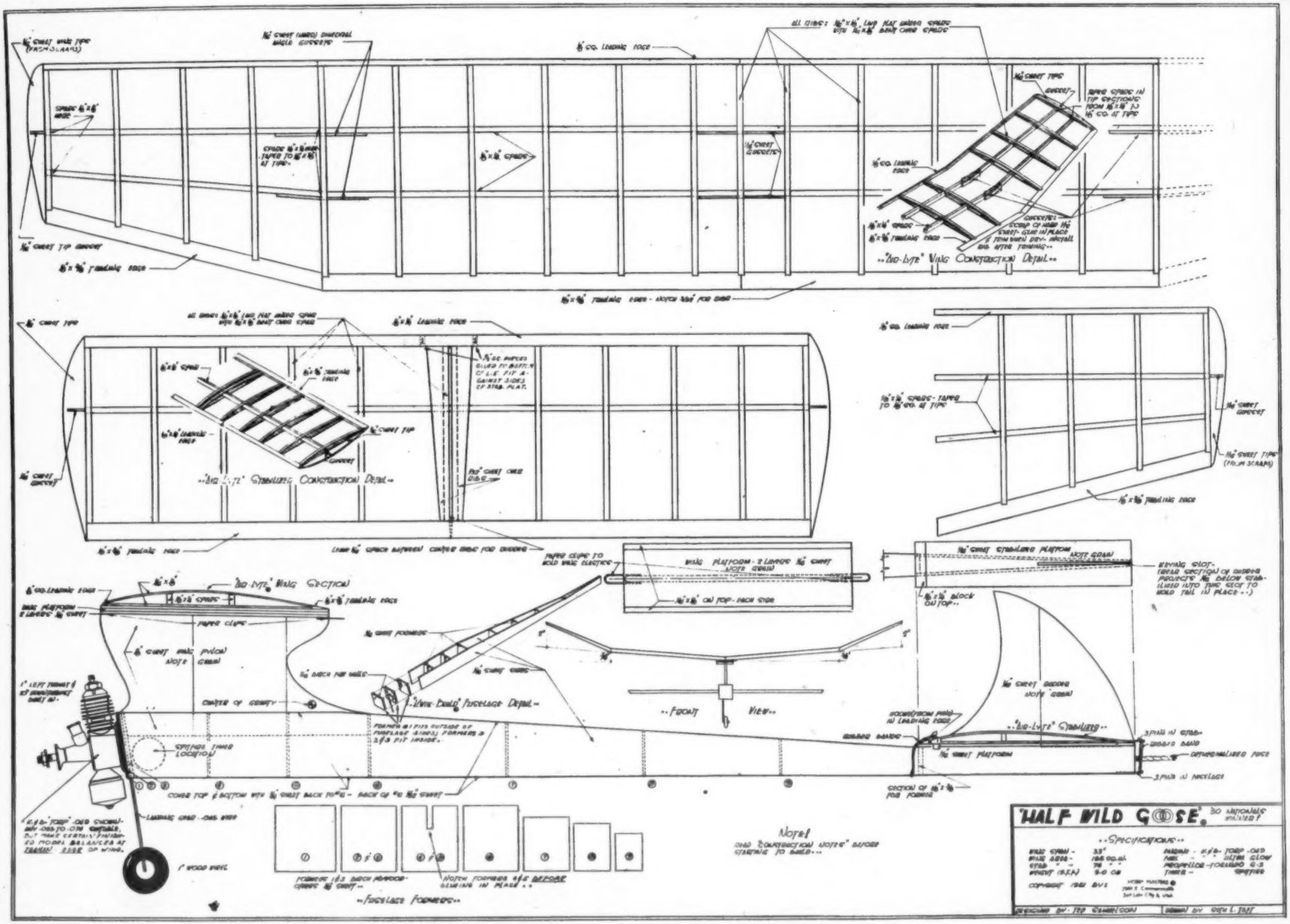
Looks as if everybody smiles with this job. Mary Samuelson with one that won at the 1950 Nationals. Got a load of that hardware!

▸ It was only three days before registration time for the '50 Nationals at Dallas. Ted and Mary Samuelson had been experimenting with AA free flight designs for more than a year. Now Ted hand-launched their final perfected design, the *Half Wild Goose*, into the wind at Utah's Bonneville Salt Flats on one last test flight. With a sizzling rocket-like climb the tiny plane streaked upward, straight as an arrow, heading continuously into the wind until it was just a speck in the sky in 15 seconds. As the timer snapped off the fuel supply the engine sputtered to a stop and the plane leveled off with hardly a dip going into a lazy, graceful glide in small circles to the left. The model glided on the verge of a stall but her long moment arm and lifting stabilizer kept her in an almost perfectly level glide. She circled slowly and seemed to get tinier and tinier as rising air currents carried her ever upward until the blue sky swallowed her up completely.

The model was gone but Ted and Mary both knew they had finally perfected an AA free flight design that would be hard to beat. They stayed up until 2 A.M. building another *Half Wild Goose* and then left for Dallas at six the same morning. They drove straight through, arriving barely in time to get registered, and then flew their precious *Half Wild Goose* to first place Class AA Open on only two flights—the last one a ten minute out-of-sighter.

In addition to winning a first place in the '50 Nationals, *Half Wild Goose* models have won 11 other first places in local and regional contests. It still holds several official A.M.A. endurance records. Two features of the *Half Wild Goose* make it such a fine flier. Its ten-degree downthrust gives a straight steep climb continuously into the wind with no "hanging on the prop," stalling or circling; and its long moment arm gives it one of the flattest glides possible for an AA free flight model.

Cut the fuselage sides to shape from medium hard 1/16" sheet. Pin and cement them together at the rear; while sides are drying cut out the formers, also from 1/16" sheet, and cement in place from rear to front. Cut the two firewalls (numbers one and three) from 1/16" birch plywood and former number two from 1/16" balsa so that numbers two and three fit inside the fuselage sides and number one fits outside. Bend the landing gear from .045 music wire, sandwich it between the firewall pieces numbers one, two and three, and squeeze with pliers, thereby imbedding landing gear into the balsa firewall piece number two. Then smear cement on the three firewall pieces and the landing gear; use clothespins (*Continued on page* 58)



FULL-SIZE PLANS FOR BOTH "HALF-WILD GOOSE" AND "FIRECRACKER" AVAILABLE. SEE PAGE 50.

The Thomas Morse MB-3

by Robert C. Hare

After the world war, Thomas-Morse picked up the best European ideas, added their own, and came up with a pursuit that set the pattern for the glamor fighters of the twenties; was backbone of our pursuit squadrons.

Most maneuverable, swiftest (164 mph), and fastest climbing ship of the day, the MB-3A. Looked like a Spad with SE-5 dihedral. It was a strong, slow landing plane to boot. The MB-3A shown was modified version of MB-3. After 50 of latter were built by Thomas-Morse, 3A's were built by Boeing.

(EDITOR'S NOTE—With the Thomas-Morse MB-3, Joe Nieto and Bob Hare begin a new series based on the famous ships, military and commercial, that were built between the two great wars. This series will alternate with the popular World War I series, which will continue indefinitely.)

"If the war had lasted . . ."

That was a common speculation among aircraft engineers and enthusiasts following the Armistice of World War I. Of course, no sane person of that period was genuinely in favor of continuing the European holocaust. But there was, after the fracas was all over, a somewhat nostalgic — and disappointed — feeling which swept over the American aircraft industry.

Like players who are kept from winning a game because it has been called on account of rain, many American aviation designers and manufacturers put down their pencils and glue pots on November 11, 1918, and dropped some mighty promising designs.

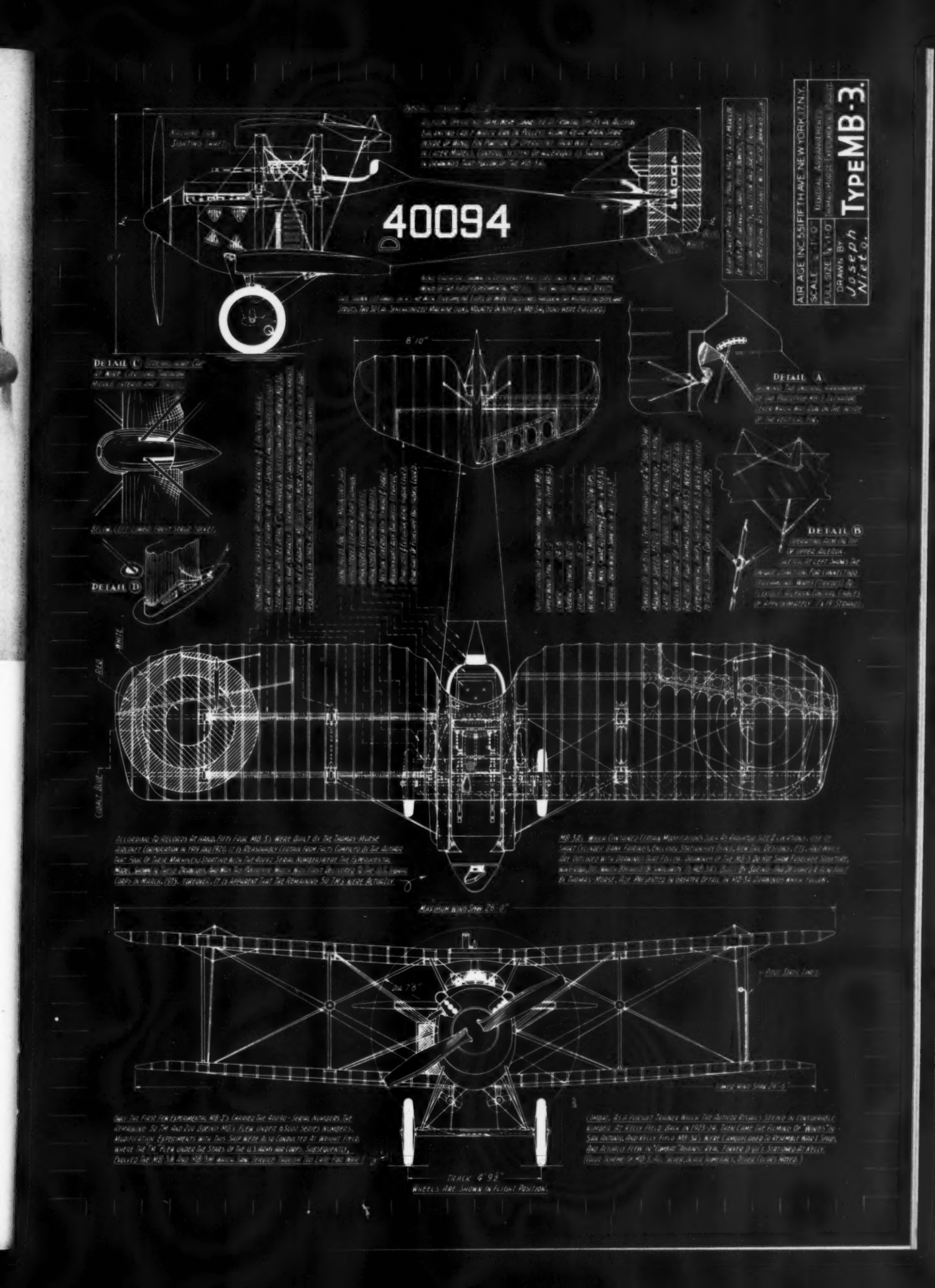
It all stemmed from the fact that the United States, birthplace of the first powered man carrying airplane, was totally unprepared in the air when war on the Central Powers was declared in April, 1917. Up to that month, the Signal Corps, which was entrusted with development of our air arm, had only 55 serviceable airplanes scattered around the country out of some 530-odd types ordered beginning in August, 1909. The largest number of any single type procured during that period was 93 ships — all Curtiss JN-4s. Not one of these more than 500 types even resembled a European military airplane of 1917. Not one American type approached the performance, technique or reliability of the foreign craft except, perhaps, the JN-4 in the trainer class.

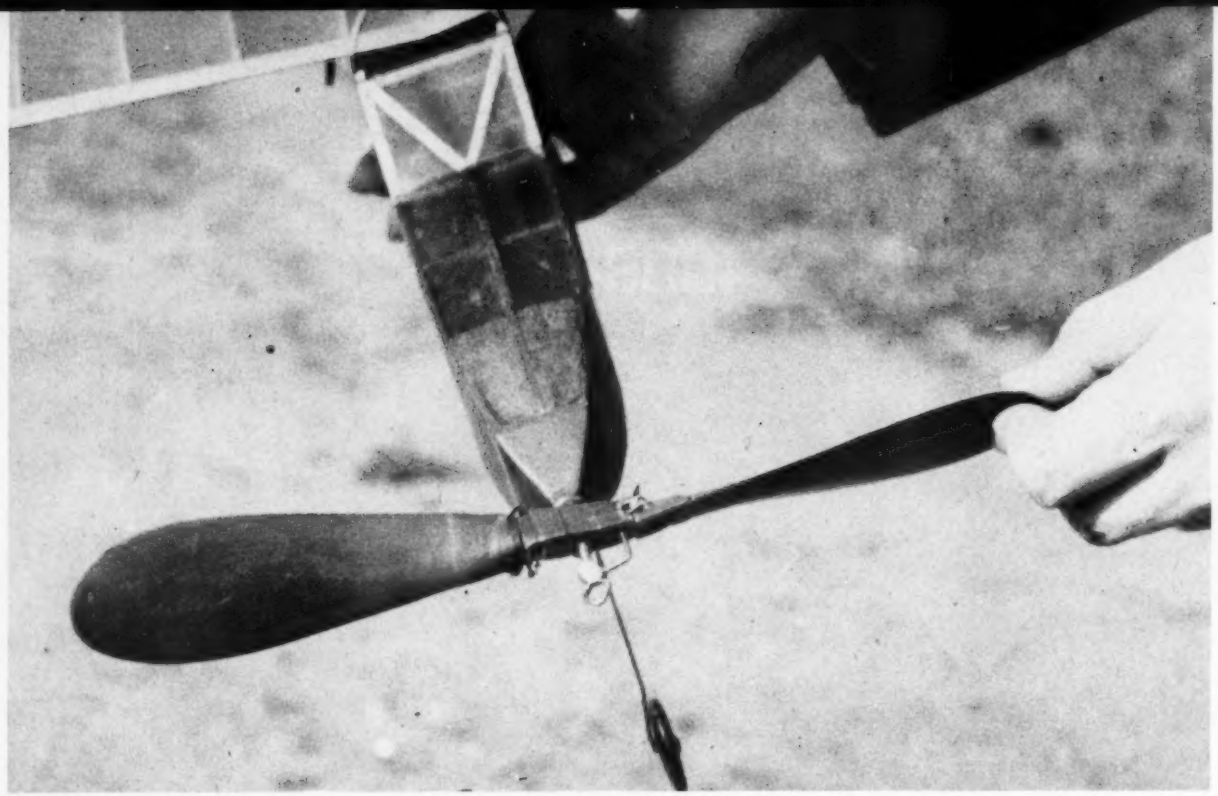
Since no "modern" aircraft existed in America — in the European sense — we devoted our energies to producing proven European designs, and the manufacture of European engines. The one exception in the engine category, of course, was our Liberty 12 engine. Its greatest use, however, was in the DH-4, the British design adapted to use it. In addition, World War I saw the limited production or preliminary construction of the S.E. 5, Handley Page bomber and Bristol fighter types of British origin; the Italian Caproni bomber; and the French Spad 13 pursuit.

As the European governments turned over to us the techniques and know-how to build these combat types, our own designers quickly caught up in the science. From drawing boards and shops of U. S. aircraft manufacturers came a series of aircraft probably as good as any in the world of 1918. Designed or developed during 1918 were such outstanding airplanes as the Martin Bomber, the Lepere, and the Ordnance pursuits.

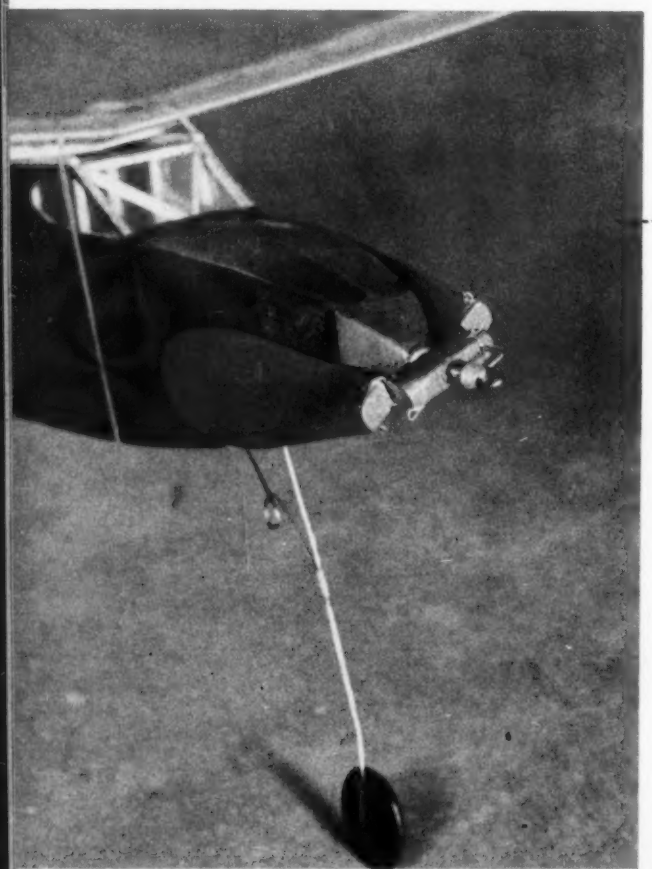
Since all the experience the American designers of the 1918 period had to go on was European, original designs carried a true "continental" flavor. Happily, however, American designers were not hampered by tradition, as were many European designers. With our entry into the war, our aero engineers not only had access to Allied techniques, but those of the enemy as well. And from captured examples of German craft, plus technical data supplied by the Allies, our designers obtained practically overnight a vast wealth of source material.

During the summer of 1918 our designers, relieved of the job of adapting foreign designs to American manufacture, literally let their hair down. One such manufacturer was the Thomas-Morse Aircraft Corporation of Ithaca, New York. This firm was established in 1910 as the Thomas Brothers. At its head were W. T. Thomas, who had worked with Glenn Curtiss and Thomas Baldwin, and Oliver Thomas. In its early days, several successful planes were built, including the engines. The firm really got into the swing of things in 1913 when B. D. Thomas joined the firm. He had been an engineer and designer for Vickers and Sopwith in England, later (*Continued on page 54*)


TYPE MB-3.
AIR AGE INC. 551 FIFTH AVE. NEW YORK (17) N.Y.
SCALE = 1'-0"
FULL SIZE 1/4" = 1'-0"
UNIVERSAL ALIGNMENT
NORMAL (ADJUSTABLE) POSITION
DRAWN BY Joseph Nieto.
40094
DETAIL A
DETAIL B
DETAIL D
8'10"
RED
WHITE
COBALT BLUE
MAXIMUM WING SPAN 26'0"
DIA. 7'6"
TRACK 4'9½"
WHEELS ARE SHOWN IN FLIGHT POSITION.



Close-up of propeller used in the tests shows how it was designed to function both as a freewheeler or as a folder, in order to use just one prop.



Folded blades reveal tiny loops on hub and blade root which can be used to prevent folding. Test flights were made near dusk in cool, calm air.

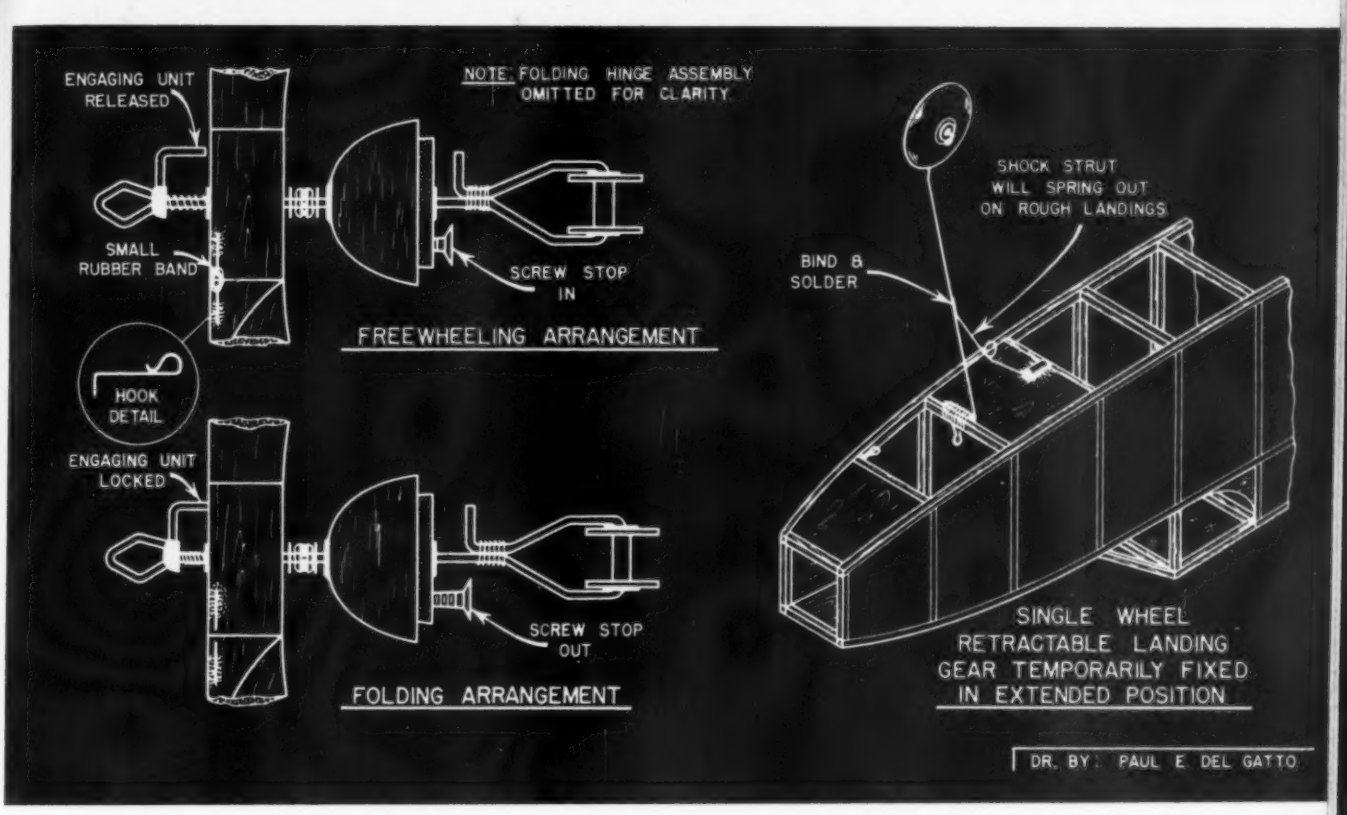
folders are best

by PAUL DEL GATTO

Ever since folding propellers came into actual use on model aircraft, their superiority with respect to the previously accepted method of freewheeling the propeller has been questioned time and again. There are a great many model builders, both national and international, who still firmly believe that the freewheeling propeller is superior to the folding propeller. There have also been articles published from time to time which give sound reasons for both sides of the argument. This only served to add to the confusion, and as a result many of us relied on the past performance of others to establish which was superior.

To one who firmly believed that the folding propeller is superior to the freewheeling propeller, it was quite a blow to realize that a freewheeling propeller was used on both the 1949 and 1950 Wakefield winners. This undoubtedly created a doubt in the minds of many model builders, as we know it did to us. We realized that the only way a definite conclusion could be reached one way or the other, was to conduct actual flight tests. However, conducting flight tests posed many problems, each of which had to be considered individually.

First there was the propeller itself. If we carved two propellers of like dimensions and took care to make them as identical as possible, chances are the results would be fairly accurate. However, to do this would serve no purpose, as the argument could always be advanced that since two propellers were used, there was always the chance the


ENGAGING UNIT RELEASED
NOTE: FOLDING HINGE ASSEMBLY OMITTED FOR CLARITY
SMALL RUBBER BAND
SCREW STOP IN
FREEWHEELING ARRANGEMENT
HOOK DETAIL
ENGAGING UNIT LOCKED
SCREW STOP OUT
FOLDING ARRANGEMENT
SHOCK STRUT WILL SPRING OUT ON ROUGH LANDINGS
BIND & SOLDER
SINGLE WHEEL RETRACTABLE LANDING GEAR TEMPORARILY FIXED IN EXTENDED POSITION
DR. BY: PAUL E. DEL GATTO

After freewheelers won both the 1949 and the 1950 Wakefield finals, this unique flight-test program was devised to settle the old argument of fold or not to fold.

winning type had a more efficient propeller blade.

With this thought in mind a simple arrangement was designed for using the same propeller for both folding and freewheeling arrangements. Basically the propeller is constructed in the same manner as is the average folding propeller with only a few modifications or additions, the discussion of which will be taken up later on in the text.

The next consideration was the actual size of the propeller. You will note from the photographs that the propeller appears to be smaller in diameter, pitch, and blade area than the propellers generally found on models of this size. There were two reasons for doing this. First, we felt that any difficulties which might occur with either type would be most apparent if a relatively high rpm were used. If this were the only reason, we could have used the original contest propeller in conjunction with increased power.

However, this would have made the model very sensitive to adjustments, thus making it very difficult to evaluate the merits of each test flight. Therefore, in order to simplify the task of adjusting and flying the model, a sport type propeller was designed. In this manner, the power could be reduced, while still maintaining the high rpm that was necessary.

The actual testing of the model was done under the most ideal conditions for obtaining accurate results. All flights were conducted at dusk, in very calm and cool air, thus minimizing the possibility of the model riding a thermal during the flight. Since it was still not impossible to catch a thermal, it was established that only those flights within a three second range of the most duplicated flight time would be used.

The amount of winds used was determined largely from preliminary tests. It was decided, that sufficient power should be used to obtain flights of approximately one minute. This proved to be more than ample to achieve definite results, and the limited time in the air meant more test flights in rapid succession. Thus the amounts of winds to be used was established at one hundred with a 4:1 ratio winder, this being slightly under one half the estimated winds available. The time of the motor run was checked at 16 seconds consistently.

Flight tests were conducted on a total of four separate days, alternating between the folding and freewheeling propeller for each successive flight. Of the 100 flights made, only 16 were not recorded. Of the 84 recorded flights, the following ten selected for each type, were the ones most closely connected in flight time, in successive order: *Folding Propeller*—1:04, 1:05, 1:05, 1:06, 1:05, 1:04, 1:05, 1:05, 1:07, 1:05; *Freewheeling Propeller*—0:53, 0:56, 0:54, 0:56, 0:57, 0:56, 0:56, 0:54, 0:55, 0:56.

Thus with less than half the power we can note that there is a nine-second gap in flight times between the folding and freewheeling propellers. With full power it becomes quite apparent that this gap will increase until it is 20-50 seconds.

Many exponents of the freewheeling propeller argue that the main reason they stick to the freewheeling propeller is to retain the same c. g. position between power on and power off. There is no doubt that the c. g. does shift if you are using a folding propeller. However, if you consider this when making thrust adjustments you should not experience any difficulties. Should you wish to minimize this condition, use a single blade folding propeller (which we feel is superior) to minimize the shifting of the c. g. between power on and power off.

In most cases it is not the c. g. shift that does the damage but the unusually high power used in many designs, which creates a nose high attitude at the end of the climb. The only cure for this is a longer motor or less strands, either of which will result in a less spectacular climb but will get the model up to the same altitude or possibly more. The longer motor run induced by this change will in all probability add precious seconds *(Continued on page 55)*

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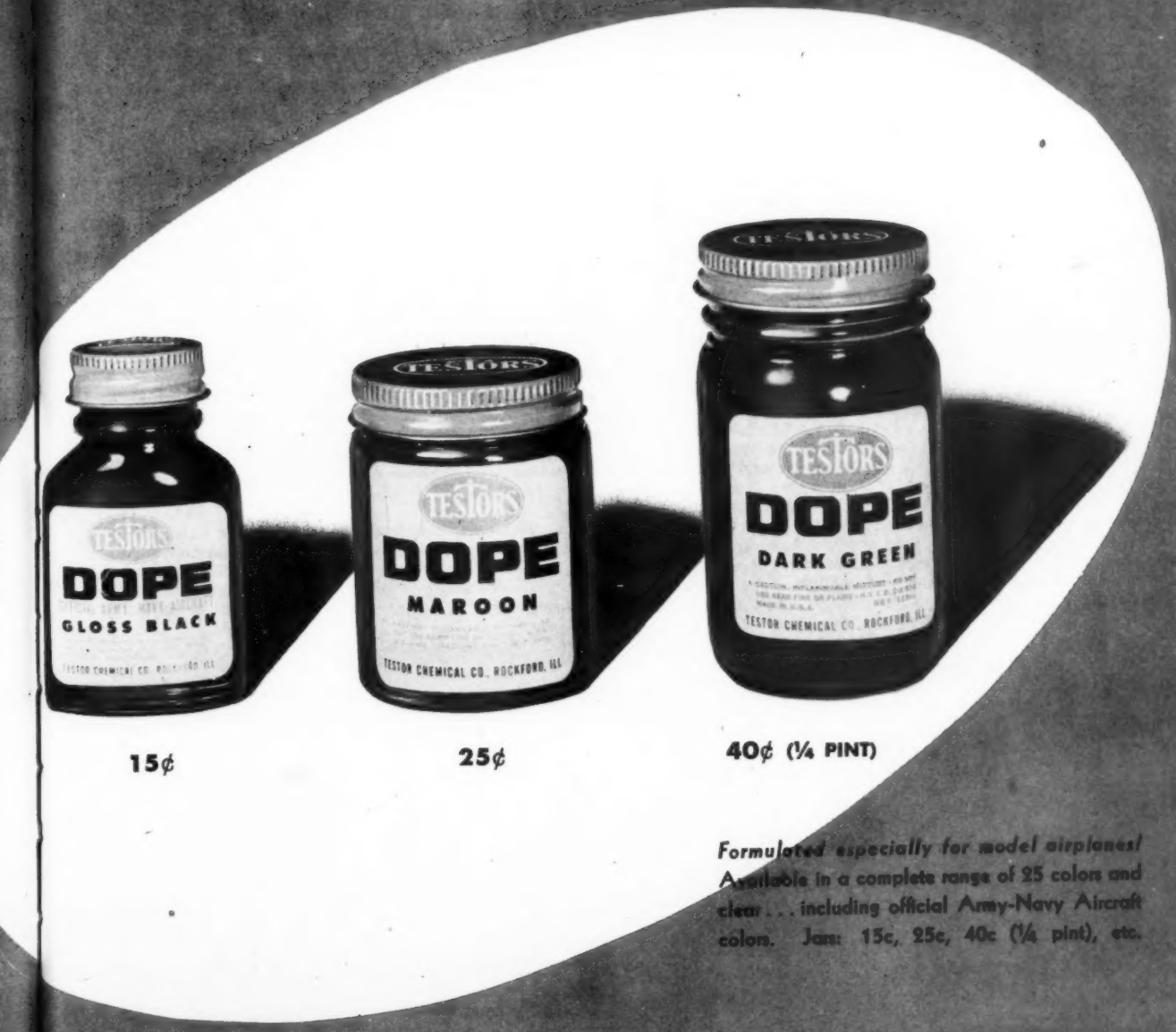

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An almost exact copy of the prototype in which Tony Le Vier averaged 250.886 mph to beat out Art Chester, Joe Jacobson, and Earl Ortman.

FIRECRACKER

by Dick Ealy

Winner of the 1938 Greve Trophy Race and one of the hottest planes of the era, the *Firecracker* has beautiful but simple lines for a team racer. Our test model won against F.A.S.T. members, then took Southern Cal. Plymouth meet. Flies like crazy.

Firecracker is a semi-scale team racer design adapted from the 1938 Greve Trophy winner, one of the hottest speed ships in that era. The Keith Rider *Firecracker* flown by Tony Le Vier, now chief test pilot at Lockheed, averaged 250.886 mph, beating such greats as Art Chester in the *Goon*, Joe Jacobson in *Eightball* and Earl Ortman in *Jack-Rabbit*. The beautiful but rather simple lines of the big ship make for simple slab side construction. By reinforcing the forward portion of fuselage with plywood doublers we get a sturdy design able to withstand lots of abuse and chalk up flight after flight. This is one of the secrets of speed craft—having it hold together so that the propeller and fuel combination delivering the maximum speed can be found.

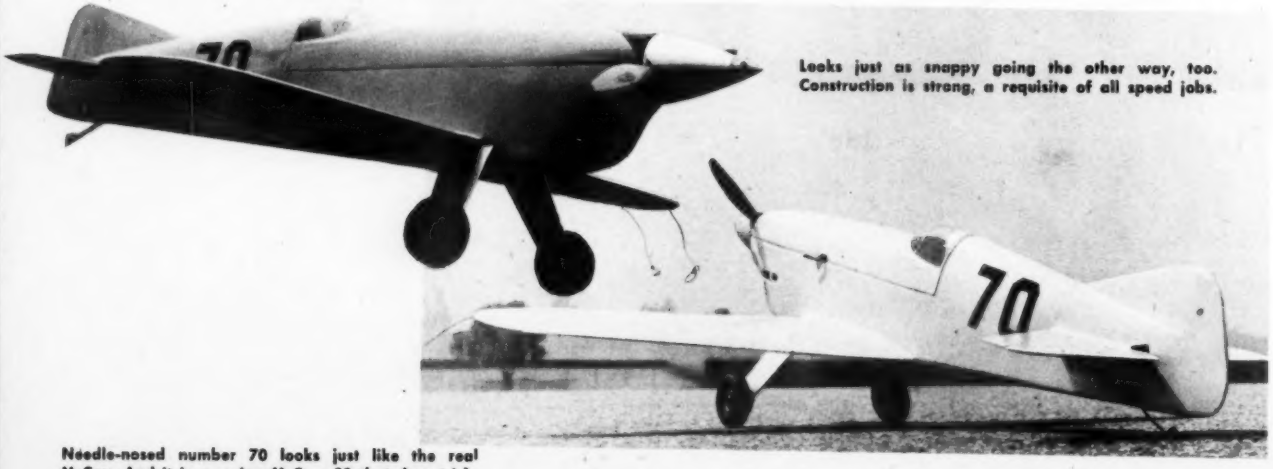
In order to find out if our original plan was practical, one of the younger members of the F.A.S.T. club built the first ship. Paul Peszynski, a sophomore in Glendale High, had been building models about a year and a half including several not too successful team racers. It seemed they just were not rugged enough. Upon completing the *Firecracker*, the model flew well right from the start. With Dad acting as mechanic, the father and son team squeezed more and more mph out of the ship, winning their first trophies in competition against the older and more experienced F.A.S.T. club members. The climax was their victory in the Southern California Plymouth meet. A good ship and a good crew!

CONSTRUCTION

Make fuselage as shown in steps one, two, three, and four. First, hardwood motor mounts are cemented to the plywood side doublers. Use Weldwood glue for all joints forward of bulkhead D. Next cement plywood doublers to sheet balsa sides. Place side panels upside down on work table and add bulkheads B and C. Hardwood crosspieces are cemented at A and C. Trim balsa sides to plywood contour where top of wing will ride. In the last step, pull sides together after beveling the inner side, and cement. Add lower bulkhead sections at D, E, and F, then cement upper formers in place at these stations. Omit stringers until tail is mounted. Cement plywood bottom in place. Install plywood baffle behind engine between crosspieces A and floor at B.

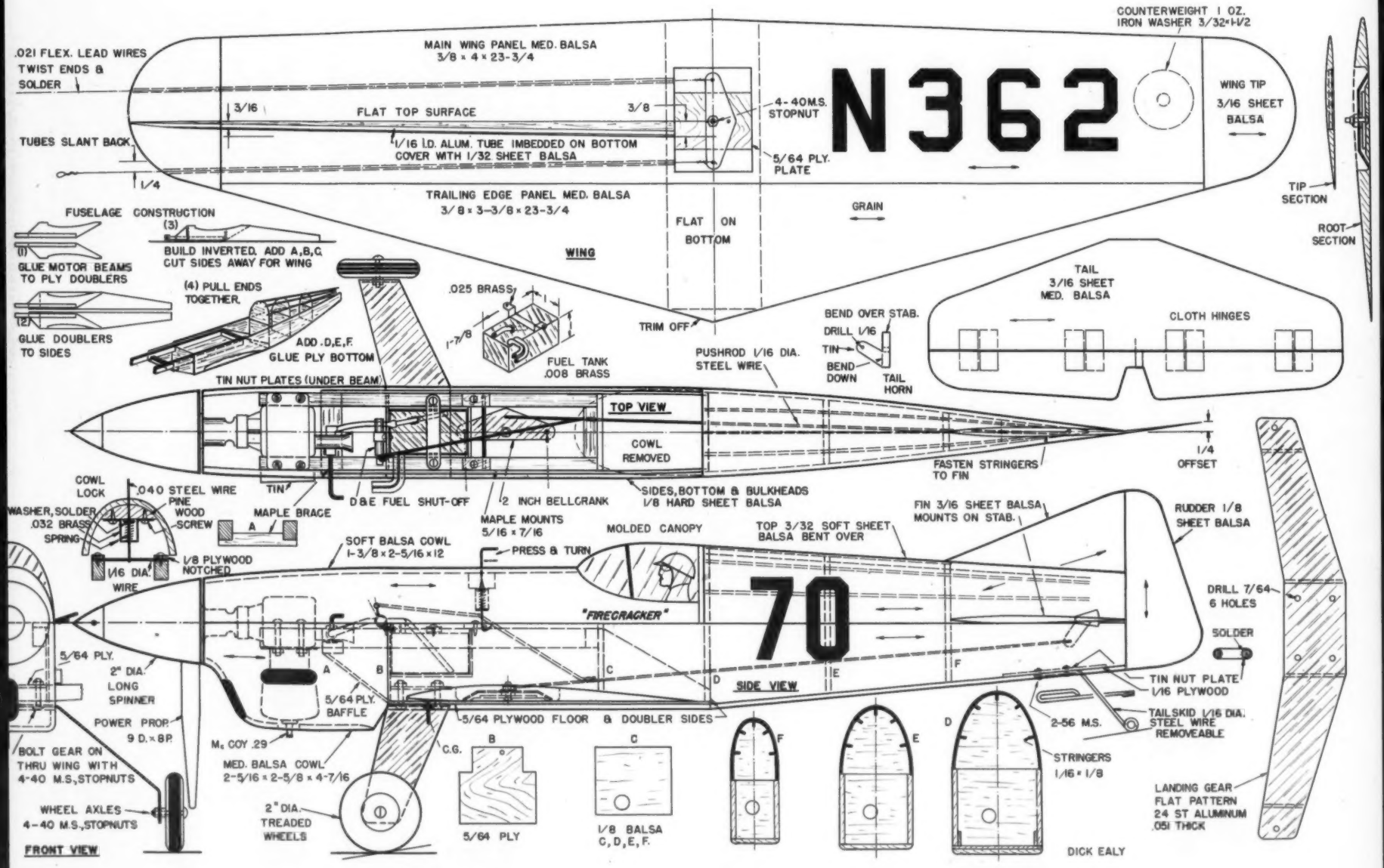
TAIL

Make horizontal tail from quarter grained balsa, medium or hard grain. Sandpaper to streamline section, install cloth hinges in place and tin tail horn which slip over elevator. Make pushrod from 1/16" dia. piano wire and insert through tail horn, (*Continued on page* 59)



Looks just as snappy going the other way, too. Construction is strong, a requisite of all speed jobs.

Needle-nosed number 70 looks just like the real McCoy. And it is a racing McCoy .29 that does trick.



FULL-SIZE PLANS FOR BOTH "HALF-WILD GOOSE" AND "FIRECRACKER" AVAILABLE. SEE PAGE 50.

Tail first. A *Spitfire*-powered canard is test glided by Eugene Smith, who has developed a whole series of successful canards. Though a tail-first job, this canard is not a pusher. Note engine.

by Russ Nichols and Carl Wheeley

AMA

official news

Switzerland Wins International Free Flight Championship • Britain Is International Control Line Winner • Plymouth Fifth Internationals • New Records Established • The Record Models • National Records Pending • Contest Calendar.

Switzerland Wins International Championship Free Flight Gas Meet. The international free flight gas model meet was held at Paris, France, on July 15. With individual and team championships at stake, Switzerland placed highest in both categories. Schmid, Lauchli, and Gerber, all of Switzerland, placed first, second, and sixth, respectively.

The U. S. was represented by Dave Kneeland, Hickman Mills, Mo., Joseph Elgin, Cleveland, O., and Henry Dore, Louisville, Ky. Under the circumstances, we feel we were extremely fortunate in being represented at all and having Kneeland place seventh and Elgin tenth. Kneeland and Elgin, you may recall, were on our Wakefield team and stopped off at Paris on their return trip home. Dore was studying in France at the time. Henry Dore has just returned from France and, while at sea, was able to send a good account of the contest.

"The international (but not championship) radio control contest was held on July 14. Elgin and his wife stayed in town to do some shopping but Kneeland and I went to watch the radio meet and do some test flying.

"We had a good general impression of the radio contest. Some of the ships performed very well and would do okay at any of our meets but we still have the impression that the U. S. holds the edge in radio flying. Our average performance seems better. Of course it may be that the best of Europe were not at the contest. We noticed in particular the flying of a radio-controlled glider that turned in more points than any of the gas jobs! Some of the British models seemed very maneuverable and could turn on a dime.

"Since it was Bastille day we took part in the street celebrations. Kneeland distinguished himself by winning a bottle of wine at a shooting gallery. This also won him the nickname, "the cowboy." I must explain that to the French he was "just like in the westerns." He could shoot, he wore tight pants, he came from the West . . . he was a cowboy! The big sensation, however, came the next day during the heat of competition when our "cowboy" took off his shirt and displayed two large American flags tatooed on his chest (with two little birds on each shoulder)!

"We were out on the field early next morning before the bus from Paris brought Elgin and the other contestants. Our troubles soon began when a jeep ran over Kneeland's box and smashed his ship. Shortly after, I lost my model on a test flight (the fuse apparently went out). Elgin got off to a good start with over four minutes on his first official but lost the ship. Kneeland managed to repair his model and take off in time for the first round but had an engine over-run.

"Nevertheless, Elgin was in second place at the end of round one. Since he represented our best chance, we hurried lunch to search for his ship but never found it. In the afternoon Kneeland took his other flights but had carburation and flight-timer troubles. He did manage to average close to three minutes thus placing him honorably. My ship was found in the afternoon but too late for even the second round. (*Continued on page* 60)

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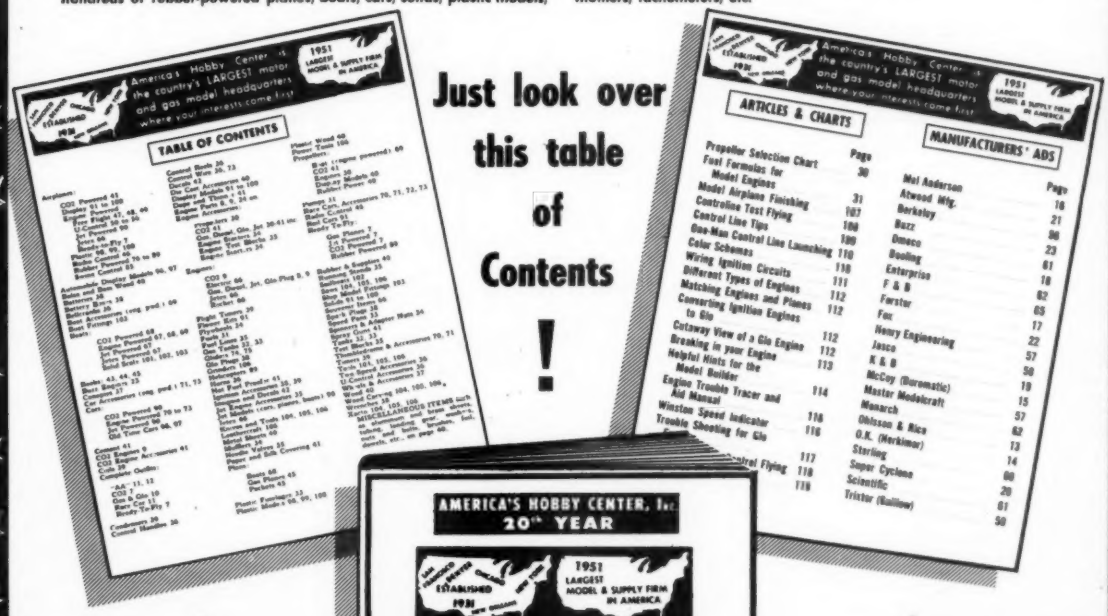
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Change the Free Flight Rules!

Re the free flight gas rules, we shouldn't let revisions go through which outlaw models previously legal. The writer is solidly in favor of making the rules simple; the present ones are a great step in that direction, but . . . more can be done . . .

1. Eliminate the power loading rule. Reasons: Cut out long processing lines; scales found at the majority of contests are of doubtful accuracy anyway; and—more important—my hat's off to the guy who builds it light and completes all his officials with one ship. Yep, I like the one ship per event rule.

2. Start timing R.O.G. flights *when the model leaves the ground.* Reasons: This would help eliminate the "did he shove or was it pushed?" question; also, there are plenty who think the rule reads this way now.

3. Base scoring on total time of four attempts, with 5-minute limit on flights. Overtime engine run, dropped parts or assisted R.O.G. take-off get zero; only collision (beyond flyer's control) gets another try. Otherwise, all times are official. Reasons: The four attempt deal promotes efficiency; the 5-minute limit gives the fellow at the smaller flying field a break. Contests would move along faster, giving more contestants a chance to make all of their attempts . . .

Have discussed the above with Maury Schoenbrun, a veteran gas modeler if there ever was one, and he not only likes the ideas—says it would get him into contests again—but also adds the proposal that engine runs be reduced to 10 seconds H.L., 13 seconds R.O.G. He further suggests more of an incentive toward flying—5 attempts as described above, but with a 4-minute limit; the idea being that if you can do it in the evening, you can do it any time during the day."

Val Luce
Flushing, L. I., N. Y.

France—As Seen by a Kentuckian

Well, I am back in Louisville now from a year's stay in France . . . I wasn't in Paris but a few days when I went out to *Issy-les-Moulineaux,* the nearest field to Paris, to watch the Sunday afternooh flying. Then I really got into the thick of it! I sent for my Wakefields that had stayed in Louisville, built a towline glider, a gas job, joined a club and began to take in most of the meets. . . .

I found a considerable amount of activity in rubber in Europe. In France, however, it is not as popular as towline gliders or even Free Flight Gas. Since Wakefield rules now correspond to F.A.I. rules, more builders build Wakefield models which they use for general contest work. In the winter season, practically everyone builds a *Coupe d'Hiver* model. . . . Over 120 contestants lined up this last February under ideal conditions. It was dead calm and with a very low overcast. There could be no question of thermals. The winner averaged 1:28. The best time of the day was 1:32. To understand what these flight times mean, remember that the rules only allow ten grams of rubber (1/3 of an ounce) and yet the ship must weigh a minimum of 80 grams. . . .

In Wakefield the French have yet to try building super light models as it seems to become the trend everywhere now. They recognize that it will take such models to win in the Nordic countries, but they feel that such a ship would never go through a regular contest season. The French believe the 50/50 (4 oz. rubber, 4 oz. model) Wakefield is about the limit for a practical design, capable of holding out for many contests. . . . In calm air, they do about 3:00. Next year, some of the French builders will probably try the "indoor-outdoor" model that seems to be needed to win "up North," but the majority will stick to their 50/50 formula and wait for things to "come South" again.

By far the popular event in all continental Europe is towline gliders. I always liked towline flying and I thought I knew something about it, until I entered my first European meet and ended up 45th, 32nd, etc.! I caught on, however, and won a couple of times before leaving. . . .

After flying towline gliders in France, I think I could explain why this type of model was never very popular here: 1—We never have used towing winches; 2—we used too short towlines; 3—we have split the towline into a ridiculous amount of classes according to wing area instead of different types of gliders. . . . The winch makes towline flying practical and fun; you do not have to continually untangle your line. You can wind it in right after use and only unwind it as you make a flight. This makes large meets possible. Then with a winch there is no need to run! Just wind in to get started. If there is but just a slight wind, the ship will go up by itself if your hook is at the Cg.

The present F.A.I. rules call for a 100 meter towline (300 ft. plus). There really is something spectacular to seeing a ship on a 300 ft. line, unhook straight up over the flier. With a long line, the luck factor is also reduced in competition as compared to short lines. Everybody that can get up there catches thermals. The problem is to be consistent in getting maximum altitude, which is better than to be lucky in getting the thermal. I feel sure that towline interest would grow in this country if we adopted the regular *Nordic* F.A.I. rules. After all, everyone else in the world has! The Nordic has become the "Wakefield" of tow line.

Why not also adopt a "no rule" class. This is very popular in Europe, especially with the beginners who can build simple but yet very efficient models.

What makes the European expert in this field is their experience. They have developed to perfection all the "small angles" of towline flying; tow hook position and construction, types of wing mount, towing technique, etc. They are simply horrified, for instance, to see on American plans that pins are used for tow hooks! The designs themselves are always very practical. Wings come apart, etc. They do not seem at all influenced by full size planes and do not take too much interest in making their models "pretty." This seems to be a general trend with continental builders (example, Stark and Elila). Briefly here are the general design trends in towline: tow hooks very close to the Cg. Once the tow hook is placed, it is seldom moved, even in a strong wind. Moving hook forward changes towing characteristics. Tow hooks must be made strongly and rather long to prevent unhooking during the steep climb. Most serious models are equipped with autorudder. This guarantees consistency in towing. Offset hook is more tricky and more unreliable but are used by many on simple models. Towing stability seems to come from four things: tail moment arm, rudder area, tow hook position, and dihedral. The chief criticism of American towline seems to be the very short tail moment arm used. They are often untowable on long lines. European builders do not try for too tight a turn in the glide. They let the ship tighten up by itself while in the thermal. The Nordic people seem to have come up with interesting designs lately. They use long nose moment arm, fairly small rudders and very little dihedral. These ships seem to turn very tight in a skidding turn, without increasing their speed.

Henry Dore
Louisville, Kentucky

Free Flight Internats?

. . . the average continental organizer seems a bit chary of trade sponsorship (even if it only goes as far as donating an award) and the field is still further limited by the desire on almost everybody's part to limit the number of international events.

At present we in this country are only able to send teams to the Championship affairs (Wakefield for rubber, A/2 for glider and the Belgium Knocke meeting for control line). In addition there is the Power Championship staged in France this year, for which at the moment there is no trophy, and I learn that the Swiss were the winners. Very few competed actually as the date had been altered from that originally scheduled and we did not send a team in view of the fact that the postponed date clashed with another big affair in this country.

Quite frankly, I feel no international free flight gas event will succeed unless it is based on the standard F.A.I. Championship regulation which limits engine size to 2.5 cc, and of course the usual F.A.I. measurements. The impression I gained is definitely that no international event should be recognized unless the models are to a given specification, which of course means processing. This is not a big difficulty when one considers that the Championship events are always a two or three day affair with time devoted to processing. . . .

It does seem strange at this stage of affairs, with the gas model undoubtedly attracting the major degree of attention in most countries, that there is still not a really good recognized International Contest. However, I have no doubt that next year with the Power Championships being organized by the Swiss this situation will cease, for the Swiss are good organizers and no doubt will put on a really worthwhile contest. Once this has got under way it only remains then for the proper support to be forthcoming from other countries to get the event on the same basis as the Wakefield and A/2.

The main snag of course with *all* international contests is the finance involved in sending teams to participate, and in this connection we have come up against it severely this year with a considerable loss on the Wakefield.

C. S. Rushbrooke
Leicester, England

We Don't Either

I would like to praise Mr. Joseph Nieto a little for his work, especially regarding his World War I drawings of that Nieuport *28.* I don't understand where he puts his fingers on all the detail, but he sure has the "know-how." My model turned out swell.

Earle Prary
Grand Rapids, Michigan

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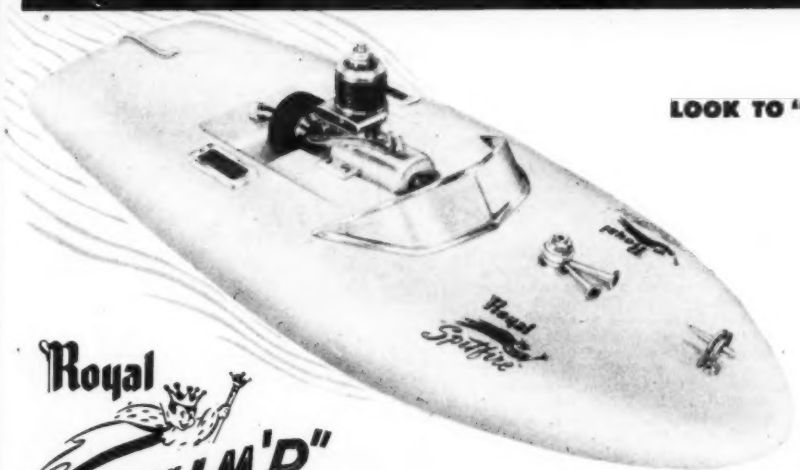

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over the counter

A monthly review of hobby developments, new items

by THE TRADE OBSERVER

America's Hobby Center (156 W. 22 St., New York 11) have released their new 6 x 9, two-color, 128-page catalogue. Distinguished by the gallery of sketches of models in kit form, it lists thousands of supply and accessory items; is unique because of the many articles on model work; listings of engine parts, prices; valuable reference data, such as spans, horsepower, etc. Featured are more than 200 U-control and 50 free flight models, hundreds of rubber jobs, solids, jets, old time cars, ships. Two full sections are given to gas-powered boats and midget cars. Catalogues may be obtained direct from America's Hobby Center at 25c per copy.

Three progressive manufacturers have been conducting a whirlwind promotion campaign with the aid of television and radio. All three programs are noteworthy for their recognizable benefits to industry in general. First, was the cooperation between Herkimer Tool & Model Works, Inc. (Harter St., Herkimer, N. Y.) and NBC in a telecast based on production of Cub engines. More than 50 stations handled this "Reel 47 of *Industry on Parade*." Since the program was available to schools in many cities after the telecast, dealers were urged by Herkimer to promote the showing of the film in schools.

Second, was the participation of Monogram (225 No. Racine Ave., Chicago, Ill.) in the "Welcome Travelers" broadcast on NBC coast-to-coast, from the College Inn Porterhouse, Hotel Sherman, Chicago. Monogram kits have proved one of the outstanding popular awards for youngsters featured regularly on this program.

Third, but by no means least, is the Mel Anderson Mfg. Co. (1819 Third Ave., Los Angeles 19, Calif.) inspired promotion "Hobbies for Everyone" which, it is estimated, 86,000,000 people will either hear or see. This promotion is part of the same program as the monster "All-American Flying Model Contest," sponsored by four major manufacturer to bring new hobbyists into the field. This Mel Anderson initiated promotion will have its impact on every dealer in the country.

Good AA stunt models are few and far between but you can chalk up another good one for F-B Model Aircraft (Denver, Colo.), whose Richard Newman has announced the *Vixen*, a 21-1/4" span ship with 126 sq. in. of area. For .030 to .065 engines, the *Vixen* has a built-up fuselage, formed spring steel gear, shaped and notched edge and die-cut parts. Retails $1.95.

Watch Pylon Brand (Sullivan Products, 214 W. Dauphin St., Philadelphia 23, Pa.) for nylon control handles, bellcranks. Nylon, says Matty Sullivan, has widespread application, including cowls, motor mounts, landing gears, and even structures.

Cleveland Model & Supply Co. (4506 Lorain Ave., Cleveland 2, Ohio) have announced their new prefabricated flying scale "Simplex" kits of the McDonnell *Banshee*, Vought *Cutlass*, and Lockheed *F-90*, all jet planes which can be thrown as gliders or equipped with *Jetex* for power. Parts are die cut, interlocking edges shaped, tapered, notched. A notching tool is included with each kit to make the notches required by the stringers. Three-color decals, pre-bent landing gear wire, formed bubble canopies. Spans run 15 to 20 in. Price $1.00.

Design simplified down to 17 basic parts for quick assembly, Cleveland's "Quicky" flying model kits of the *Luscombe*, *Aeronca*, and *Piper*, include a one-piece cambered wing with dihedral, plastic prop. No cutting or tissue covering required. Details printed in color on the prefabricated parts. 59c each.

Watch Henry Engineering Co. (111 No. Niagara St., Burbank, Calif.) for new "Indian" models. One possibility is the *Comanche*, an AA PAA-Load job; another, the *Navajo*, an AA pylon free flight. Henry is planning production of 64 sizes and type of props for possible March 1 introduction.

Dmeco (Williamsville, N. Y.) has something new and different coming up, according to Harold deBolt. DeBolt has been experimenting with PAA-Load models, as well as rc, so anything is possible . . . DMECO recently enlarged their plant and is replacing printed parts of older kits with die cut parts . . . Scranton Hobby Center (315 Adams Ave., Scranton 10, Pa.) have added to their list of historic auto kits, the 1902 air-cooled Franklin. In 3/4 scale, is 7 in. long, retails for $2.50. . . . In 48 cc jars at 35c, Stewart-Lundahl Co.'s (7349 Coldwater Canyon Ave., No. Hollywood, Calif.) 410M Plasticate is a quick, transparent drying plastic bonding agent, which is used by many cabinet makers in preference to ordinary glues. Useful on wood, paper, pottery, leather, cloth, etc., it won't peel, crystallize, or decompose. Defies shock, moisture and solvents. . . . National Model Distributors (3512 No. Greenview Ave., Chicago 14, Ill.) now have their new Model Engine Parts Catalogue; helpful to dealers. . . . Comet Model Hobbycraft, Inc. (129 W. 29 St., Chicago 16, Ill.) have added two new numbers to their F line of "Structospeed" kits: F-13 *Thunderjet* and F-14 *Sabre* jet. Megow (division of Comet) has available in 25c prefabs—"Speedo-matic"—these six kits numbers: Taylorcraft, Cessna, *Sabre* jet, *Thunderjet*, *Mustang*, *Spitfire*. . . . Styled after Goodyear-type racers, Scientific's (Scientific Model Airplane Co., 113 Monroe St., Newark 5, N. J.) *Little Ace* team racer for small bore engines does 76 mph with an .099. Span 18", area 54 sq. in. Completely prefabbed with shaped parts; retails $1.95.

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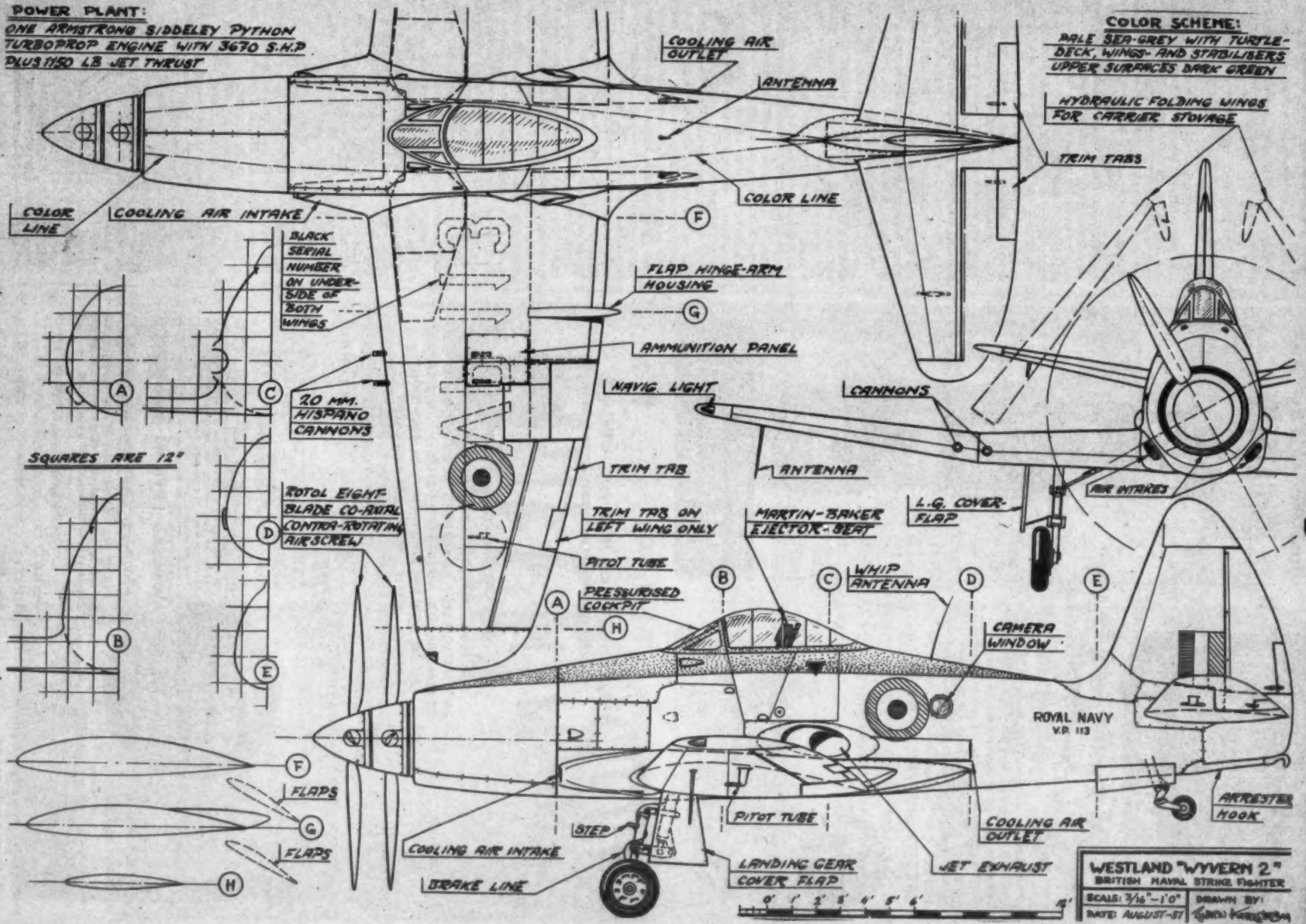

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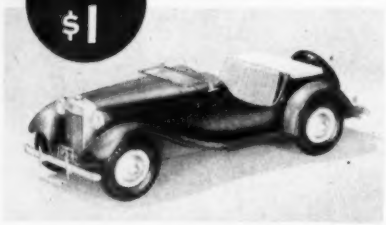

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Planes in the News

(*Continued from page 15*)

accentuated by a long curved dorsal line from the canopy right back to the vertical tail.

At Farnborough, the plane was roped off behind a special enclosure and no pictures were permitted from closer than 100 yds. This is the first time that such secrecy measures have been imposed at a public display, and certainly that is some indication of what the British think of the P1067. (Incidentally, the ban applies also to the Vickers Valiant, Supermarine 535 and Supermarine 508.)

Maybe you don't know about the Farnborough display. Each postwar year—and in prewar times as well—the British aircraft industry holds one bangup show, where latest types are demonstrated in flight and on the ground. It's a wonderful opportunity to get up close and photograph and sketch to your heart's content, because with very few exceptions, nothing is roped off or listed as secret. It's as if Wright-Patterson Air Force Base were opened for one week, and one of every plane we had were on display. You could crawl all over the F-86 *Sabre* and the F-89 *Scorpion* and through the tunnel on the B-36. And you could photograph them, instead of being impolitely and quickly kicked off the base by Air Police.

The list of aircraft here is an impressive one. It includes the current standard RAF and Royal Navy types, as well as prototype aircraft which have a minimum of ten hours flight time. Transport and trainer, fighter and freighter are parked along the black-topped runways at the airport of the Royal Aircraft Establishment at Farnborough, in Hampshire. And in addition, there is an exhibit hall—a gigantic tent—where manufacturers of accessories, equipment and aircraft display models and samples of their efforts.

There you can see the first composite engine built in Britain—the Napier Nomad which combines the ordinary piston engine with a gas turbine to drive two propellers. You can see the Snarler, 2000-lb. thrust rocket motor developed by Armstrong-Siddeley. And you can drool over the best collection of scale models—plastic cutaways, completely furnished interiors, turning propellers—that you've seen in years.

But getting back to the flying display, there is no question but what the single outstanding demonstration was the Hawker P.1067. S/Ldr. Neville Duke flew the craft during its breathtaking highspeed runs, and made such an impression on the crowd with flashing by that they ignored the fact that the machine is one of the most maneuverable little beasts in the air. It has a rate of roll of about two complete revs. per second, and no doubt can do better.

It would be tough to pick a second best performance. There were some hair raising aerobatics by S/Ldr. Zurakowski flying a Meteor 8, modified as a ground attack job. Zura made his highspeed runs and then pulled up into a vertical climb until he ran out of speed. At the top, the plane was cartwheeled by using power on one engine, so that the plane revolved around a line perpendicular to the cockpit. After two or three complete cartwheels, Zura allowed the Meteor to fall into a spin—incidentally the first time I've seen any jet spin, let alone one so loaded as this and recovered neatly after a couple or three turns.

There were some slow-speed runs by Falk in the Avro delta-winged 707B, which showed that such a highspeed design could also cruise along at a leisurely 150 mph or less. And Falk—probably deliberately, because he knows better—made two take-offs by banking as soon as he was airborne. The 707B—and most airplanes—sinks a little after becoming airborne, and this with the angle of bank made it appear as if he were going to dig in a wing tip. From where I was it looked like a three-foot miss, but it was probably all of four or five.

And then late in the afternoon of the first day, while the crowd was struggling to leave the parking lot, the Vickers Supermarine 508 came slashing over the field in one fast

and two slow circuits and landed. This craft is a straightwinged Naval fighter which looks perfectly conventional back about to the cockpit. Then there are two Avon engines mounted side by side which bulge out the fuselage section. And somewhat further aft is a Bonanza butterfly tail. On the second day it was demonstrated in flight and showed a good rate of speed. Actually its specialty should be climb performance and there it was not demonstrated to advantage, but it's an interesting layout, and perhaps worth the try.

For some reason I was disappointed in the Vickers Valiant, much-heralded four-jet bomber. Maybe it's because the outlines look a little conventional compared to our Boeing B-47, or maybe it's because the plane was not pushed during its flight; anyway, there was a letdown feeling. One redeeming feature was the climb performance, but that is no indication because the plane was lightly loaded. I can't quite see the advantage of this plane over the B-47.

Britain's other jet bomber—the Short S.A.4—is, as the British would say, a ghastly thing. Possessed of all the awkward lines in the world, the Short is obviously way outclassed by the Valiant. Yet during the flight display it turned over the heads of the crowd lower than any other big plane I've seen flown around. This is certainly indicative of a high degree of pilot confidence in aircraft. The big hack seemed to handle beautifully, but it just doesn't have it.

As it did last year, the Canberra made a graceful appearance as it flew effortlessly through the sky. Two types were shown—the photo-recon variation and a special Canberra with Armstrong Siddeley Sapphire engines.

There are some things that stand out as highlights of the show, and a few of them were noises. I think of the quiet hissing of the DeHavilland Dove as it took off past the stands, and the angry hornet whine of the Wyvern, and the rumbling of the Avons in the S.A.4. Some of them were colors—the silver, red and white Vickers Viscount, the sky-blue Avro 707B, the pale-green P.1076. Some of them were smells—burning rubber from tires slammed on at 100 mph.

But it isn't really the sounds and colors and smells that make Farnborough—it's the sights. Sights of the Meteor clawing for altitude and the graceful line of the Valiant wing and the stubby Boulton Paul delta P.111. Sights of the elephantine Universal Freighter and the graceful DeH Sea Venom and little Vampires. Sights of the blistering speed of the P.1076, the Sea Hawk and the Supermarine 535 contrasted with the slow walk of the Prestwick Pioneer.

Scrap Box

(*Continued from page 5*)

the United States affiliation with the S.M.A.E. enables its members to participate in all contests sponsored by that body free of charge. The Association's formation was stimulated into being by the Flying Training Command and the personal efforts of Sqn. Ldr. R. B. Lord, A.F.C., now serving (and modeling) out in Malaya. It was soon apparent that a big meet would have to be held. In September 1950 the R.A.F. Model Aircraft Association held its first championship meet, and all Commands at home sent teams to compete in various events

• • •

The U. S. Navy, not to be outdone by the Royal Air Force, staged a swell model program at the U.S.M.C.B.C. Base at Port Hueneme, California. Lt. C. W. Campbell and G. W. Pickle CD'd and MC'd the program. All of the base modelers competed for prizes which were given for workmanship and finish. Colby Evett and Howard Bonner made exhibition flights with their swell R.C. jobs. Charlie Goodale and son Lawrence gave some stunting exhibitions that were tops.

The Navy hobby shops have us drooling whenever we step inside. The choice equipment and well supervised building programs in all types of hobbycraft, are second to none. Navy hobby shops are on most all of the large bases in and out of the U. S. proper.

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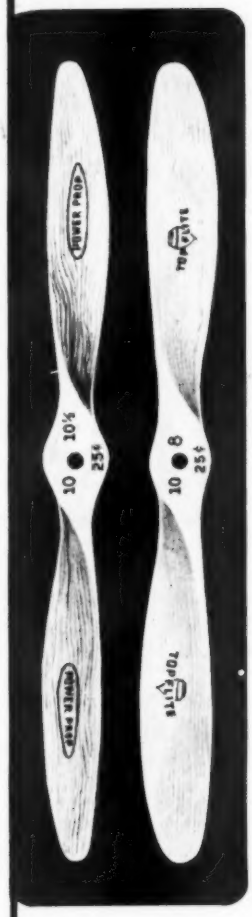

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CASE FOR PREFABRICATION

This *SE-5*, made from a Sterling kit, shows the influence of prefabrication on flying scale.

Prefabrication is the greatest thing to happen to the model plane hobby since the advent of the gas engine, yet, to hear some folks talk, you'd think it was just the opposite. But all you have to do is to look at the record.

After the war, the over-inflated model business was mighty sick as things got back to normal. It was no fault of the industry, but modelers were fed up with solids and the poor materials that were our lot during the period of shortages. What happened? A bunch of modeling veterans, who had worked for manufacturers before the war, came out of service and revolutionized the business by bringing prefabricating technique to new heights.

Any hobby or business that expects to develop and grow larger must have products that deserve public consumption. Old fashioned kits, with just a plan without details and a bunch of strips, lost untold thousands of potentially good customers through the years. Maybe that stuff pleased an older crowd of experienced modelers who once hacked their own props from pine with pieces of broken tea cups but it was no good for any average individual with no previous experience.

I-recall reading in Over the Counter in a distant back issue of this magazine that one of the biggest manufacturers in the business used to say that over 90% of his low cost kits were never completed. Was there anything wrong with the materials? Or the design? No. No one yet realized the possibilities of complete prefabrication.

How can anyone question the value of prefabrication? There is no reason why building a model should be made into a production. That blocks should not be at least profile cut, preferably shaped. That formers should not be die-cut. For a long time there has been a trend to replace tough hand operations with finished parts in kits. If builders have accepted—in fact refuse to accept any substitute—finished props in grade diameters and pitches, why suppose they do not require improved parts and pieces?

The primary aim in making models is to have fun. Prefabrication puts the emphasis where it should be, on the flying. Even so, models still take plenty of building!

Prefabrication certainly is not harmful. One has the choice of kits with performance suited to his needs. If he is a novice, more interested in sport and realism than peak performance, he goes in for hollow-shell deals and those with shaped solid wings, of which there is a slew of popular numbers. Top Flite's *Trainee*, for example, is a good sport-trainer, nice looking, highly prefabricated, yet pleasant to put together. Models like that assure flying fun that leads a builder to make more special kits or, eventually, to design his own ships.

In the high performance category, you've got proved stunters like the Veco jobs and the *Barnstormers*. The writer has built models for more than a couple of decades and can remember nails and glue. Putting together a *Chief* or a *Barnstormer* is a pleasant experience that affords adequate model building without the drudgery. Drudgery never was fun, even for the old timers.

Older modelers who learned things the hard way render lip service to expanding the hobby, which means bringing it to more kids. Models must fly. Period. What surer way is there to increase chances of flying than to prefabricate the things that tend to prevent flying successfully. There is nothing to gain and all to lose by compelling everyone to hack out his own ribs, formers, cowls, just because grandpa did it that way.

It is fundamentally wrong to dictate to any customer-modeler what he must or must not do. He is perfectly capable of deciding for himself what he likes to do. He'll never do anything he doesn't like to do.

He won't make graded kits, starting with a glider or rubber band R.O.G., once he hears a baby engine run. Not when he can make a model for that engine, using a prefabricated kit!

The modeler who has had a taste of construction work automatically chooses the degree of prefabrication he wants. He may make a swell start with a *Firebaby*, a completely finished airplane, but you can bet your boots he will go on from there.

Suppose that *Firebaby* never existed and the kid had been forced to drudge through a series of homemade chuck gliders, R.O.G.'s, and cabin jobs? Perish the thought!

THE END.

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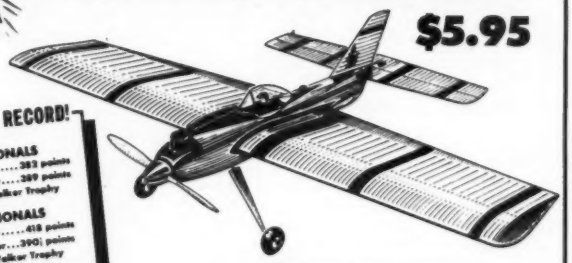

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Wing area	470 sq. in.	Speed	60 to 75 M.P.H.
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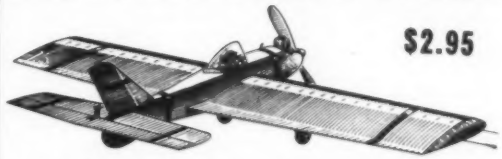

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Engine....035 to .049 disp.

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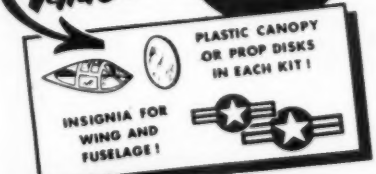

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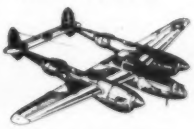

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Short Wave

(*Continued from page 21*)

for take-offs in contest work. As you will note from the plans and pictures of the *Short Wave*, considerable thought was given to beauty and general clean appearance which, to the layman, has always been a sore point in past designs. The common remark of the casual observer has been to the effect that most models in no way resemble their big brothers.

We have increased the wing loading on the *Short Wave* design, bringing it up to one pound per square foot, and have used a thin section to get the speed up. Though 16 oz. per square foot is not heavy as R.C. ships go, this design has met with our fondest hopes for speed.

By acquiring the extra speed in the *Short Wave*, we have increased the overall performance with respect to the wind, but still retain the desirable stability turnwise found in the *Hot Shot*.

The theory of the twin rudders is to keep the rudder area out of the propeller slip stream, making it possible to obtain the same turn rate, power-on and power-off—assuming a fairly constant power-on, power-off flying speed.

The power-on speed can be adjusted by engine adjustment and downthrust. The glide speed is controlled by the angular adjustment of the wing and tailplane, assuming the center of gravity remains controlled.

The wing slots are used primarily to prevent tip stalls at high angles of attack and slow panel speeds. By close observation, one will notice that the average R.C. job skids while making a turn. To those readers who are familiar with the operation of large aircraft, it is obvious that the application of an extreme amount of rudder only causes a skid or a turn about the vertical axis without the necessary bank. This skid action produces two undesirable effects which must be controlled for the maximum in stability.

The first effect is the upsetting force caused by the famous pendulum effect with a low center of gravity. The skid throws the Cg pendulum out, tending to roll the plane about the lateral axis. This effect can be controlled by two means or by a combination of two, namely high Cg and proper placement of the center of lateral area.

The center of lateral area is a center of balance of the entire area of the airplane, made up of the fuselage side fin and rudder dihedral area, wheels, etc., or all areas resisting movement of the airplane sideways.

A simple way to understand what the lateral area looks like would be to imagine a model sitting on a table with its side near a wall and a light on the other side. The shadow thus projected on the wall would give a picture of the lateral area. There is some point on this shadow, when moved against an air stream, that would be an aerodynamic center or balance (C. H. Grant Theory Model Design). When the center of gravity and center of lateral area are in proper balance, the pendulum force is cancelled.

Another, and seldom recognized force set up in a skid, is the stall of the wing panel on the inside of the turn. This can be explained as follows:

A wing surface moving through an air stream provides an equal amount of lift on each panel. By rotating the wing panel about its vertical axis as in a skidded turn, the inboard panel is slowed and the outboard panel is speeded up, with the corresponding unbalance in lift. It is obvious that the inboard panel tends to stall, while the outboard panel tends to increase its lift, thus causing the nose to drop increasing the speed in an attempt to regain the overall loss in lift. The increased speed intensifies the skid, which further accentuates the unbalanced condition until a violent spiral results. This panel stall can be corrected in two ways, namely with slots and tip washout (the warping of the wingtips up).

It becomes evident that it would be impossible to completely eliminate the loss of lift on the inside panel, even with the use of slots or washouts, so it is necessary to go

(*Continued on page 50*)

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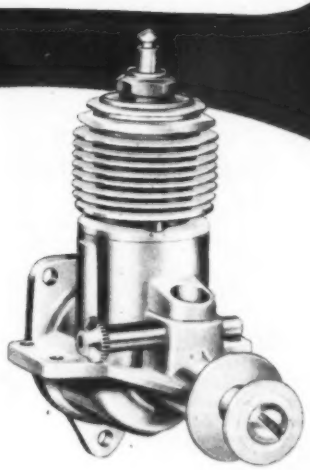

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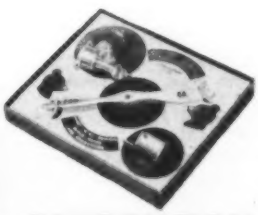

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HALF WILD GOOSE, pg. 27

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back to the big secret of spiral stability, namely the position of the center of lateral area. As covered previously in this writing, the balance of Cg and CLA would eliminate pendulum effect but to balance the forces to maintain a level turn, we must introduce a force resisting the loss of lift on the inside wing panel. This can be accomplished by placing the center of lateral area in a position where it actually causes the nose of the ship to rise in a skidding turn, increasing the angle of attack, and thus increasing the lift to a point of maintaining level flight in a turn. This can be accomplished by placing the CLA at a position to the rear and below the center of gravity.

It is very possible to design the model with the near perfect force arrangement, but as we said previously, this near perfect force arrangement was the undoing of the Hoosier *Hot Shot* in that its ability to spiral was nil.

The *Short Wave*, when trimmed properly, will make 270° of turn before any nose-down tendency is noted; then it will take another full turn to get into a full spiral.

The fuselage is built in the old fashioned way. Lay out the two fuselage sides, then assemble them by fastening the front and rear ends together and fill in the top and bottom.

The fire wall is made of 1/4" plywood and glued directly to the fuselage front. The 1/8" x 3/8" stringers are placed on the fuselage as shown and later tapered at the rear to conform with the general fuselage lines. It will be noted that on the top deck of the fuselage there are formers shown. These are circular in shape, notched to receive their stringers.

At the wing position, the forward and rear formers are set at an angle to allow the wing to pop off in a violent landing.

The front and rear landing gear legs are bent as shown and fastened to plywood bulkheads with J bolts. The wheels are VECO 2-1/2", which we have found satisfactory for normal hard surface use. We have seen fit not to show the conventional air timer. We have always used the Good Bros. motor shut off, which is very reliable if your radio works. If your radio doesn't work, you shouldn't be flying. If the builder desires, an air timer can be easily installed. We use four pen cells on the engine ignition because of the longer runs encountered in R.C. flying.

The ship is powered by an Arden *.199*, which is more power than needed. We feel it is desirable to use ignition for two reasons, namely for ease of power control and to keep glow fuel from eating up the plane. The wing is made in a conventional manner except for the slots. Don't let the slots fool you; they are really easy to build and install.

Assemble the wing in a conventional manner, including the slot ribs. Assemble the leading edge, cutting it out at the slot section. Plank the top leading edge as shown. The slots are made separate, as an extra assembly, then cemented in place (see picture). After the slots are installed and the wing completely assembled, it can be covered in a conventional manner cutting openings for the slots.

The Good Bros. escapement is mounted in the fuselage on a 1/16" plywood bulkhead and the linkage is made as shown on the plans. Take care that the overall linkage is free but not sloppy. The small turn buckles on the rudder linkage are made from brass tubing tapped 2-56. The push rods are threaded 2-56 to provide trim adjustment.

The stabilizer should be keyed to the fuselage to maintain constant adjustment. The wing is placed on the fuselage at zero degrees incidence and the stabilizer is set at minus three degrees.

These settings are built in, and with the Cg as located, the plane should fly with little or no trimming.

As will be noted by the builder there is plenty of room for the radio equipment. In the past, it has been the practice of most builders to crowd the radio into a small hole that makes repair or adjustment almost impossible. You will find the *Short Wave* has enough room to install a five tube portable.

The Citizenship receiver was installed as per the manufacturer's instructions. We use eight pen cells installed in Hillcrest battery boxes for the 6 Volt filament supply, and two Eveready 413E hearing aid batteries for the high voltage supply. It is a good idea to install a closed current phone jack on the airplane to meter the plate current and for adjustment of the relay.

The *Short Wave* has a small plywood plate set into the left side of the fuselage containing two switches. One switch is for the radio and the other for ignition.

There are a few tricks involved in the operation of the Citizenship Radio. The instructions furnished by Vernon C. MacNabb Company with the Citizenship make mention of ignition interference. This interference should not be treated lightly and a concerted effort on the part of the builder should be made to eliminate this trouble. It will be found that the ignition interference will vary with engine speed. There are some speeds that are much worse than others.

An effort should be made to keep all ignition wiring and parts as far away from the radio as possible.

The interference from the engine ignition will render the receiver inoperative by keeping the plate current from rising. To test for this trouble, plug in the meter and observe the plate current rise when the transmitter is operated. With the transmitter on, start the engine and vary the speed by advancing and retarding the timer points. At some speeds it will be noted the plate current will drop. By careful checking you will find a speed where little or no interference is observed. The engine timer should be locked at this point and the plane always flown with this setting. Of course, it is important that the propeller remain of the same size and make to maintain this speed.

Another and important consideration in receiver operation is the filament or A voltage. The receiver sensitivity falls off directly proportional to the filament voltage. We find it a good idea to bring out two terminals on the outside of the ship for testing the A voltage.

You should test this voltage before each flight and never fly when the voltage is below 4.6 Volts. The B voltage is not critical and can be operated over a wide range.

The entire ship is covered with Japan silk. Contrary to popular belief, it is very easy to cover with silk or light nylon. Before attempting to cover, you should dope the entire frame work of the ship; then wet the cloth and pull tight over the surface. Before the cloth is dry, use a mixture of dope and glue around the edges of the frame, rubbing in until the cloth is fastened securely. Take a sharp razor blade and trim off the excess, then dope the raw edge and smooth down the edges with the finger.

After all surfaces are covered, apply about six coats to fill the cloth pores. It is essential that the wing and stabilizer be pinned down during the last two coats of dope to prevent warping. If the wing and stabilizer are left pinned down for twenty-four hours after application of the last coat of dope, there is little danger of warpage.

Now for the pretty stuff. The cowl is made up of balsa, and can be made as the builder desires. We made our cowl by cutting 1/8" sheet formers to the outline shape, running both vertical and horizontal. The space in between is filled in with scraps similar to planking on a scale job. After thorough drying, the cowl can be hollowed out and sanded to shape. When you have a good surface, apply a few coats of Testor's sanding sealer, and sand with fine paper. This process can be repeated until the pores of the wood are filled, then color doped. The cowl is held on by three dowl pins in the fire wall and rubber bands hooked between the cowl and fuselage.

The plastic canopy was formed from a piece of 1/32 sheet plastic. We made a form from a large balsa block shaped to the proper size. Take the plastic sheet and heat it in an oven about 300 degrees until it gets very soft; pull the plastic over the form and clamp down to a bench until cold. This job can be performed very easily. The plane will fly just as well without the pretty stuff if the builder doesn't care to make it.

The test flying of the airplane is the same as with any other. Make sure the balance is as indicated on the plans. The angular setting of the wing and tail assembly should be correct.

We always find it advantageous to glide the ship before power flights. Find a field with tall grass and let her go. This ship glides fast and flat. Care should be taken to see that the ship glides straight before power flight.

Now power flight. Some builders prefer to fly their ships without radio equipment in the initial testing but we don't agree. We have found it advantageous to have the radio working. The *Short Wave* airplane was saved from a bad crash on its first flight by having the radio on board.

Unlike our instructions, the writer flew the plane with a bad rudder adjustment on the first flight and the plane would have surely spiraled in if the radio had not been on board.

Before any flights, it is essential that the radio be checked thoroughly both power-on and power-off.

Dr. Lippisch's Deltas

(*Continued from page* 18)

Still no luck. Ah, it must be the high tip fins, we thought. They break up the leading edge vorticies, stall out the tips and cause the whole airplane to stall. Well, that wasn't it either. We were apparently trying to fly on a margin that just didn't exist. This was really a problem. Nothing seemed to work, the model refused to fly. I got disgusted and decided to put the *100* on it and really "plant" it. The proper C.G. was arranged and the elevons set.

One glide and we were amazed. Perfect! No stalls, no dives. Just straight flat glides. It required strong misadjustment to make it stall out in a hand glide. The answer was apparent. With the light weight of the *Jetex 50* we had been trying to fly in a RN range where this particular size and design would not function properly. Why this occurred is still a very nice problem and is yet to be solved. As soon as more weight was added and the speed increased the RN went up and the model flew easily. (Is this the explanation of performance variations in various sizes of a free flight design?—Editor)

We noticed one unusual feature of this delta when it was flying. With the rounded thick leading edges it flew level or down a little for a long time after launching. When it almost scraped the ground it had attained considerable flying speed and the nose suddenly swung up, the model zooming upward in a cloud of white smoke. We tried waiting longer after lighting the fuse so that there would be sure to be enough power. This didn't make any difference. The long run before climb remained. The climb of this model did not appear to be as good as that of any of the sharp edged deltas although this may have been due to the mounting of the motor on the bottom of the wing and the subsequent need for more correction in the control vane.

Delta 50. The wing is made from medium soft 1/16" sheet balsa, preferably B-C stock. This semi quarter-grained wood allows light weight plus a stiff non-warping wing. Cut the wing pieces to approximate lengths. Start with the largest piece in the rear and cement the next to it. Do this step in "air." Coat both edges with cement, touch together, then pull apart and allow to air dry slightly. Put back together and rub the cement into the wood on both sides. Lay it on a flat surface to do this. Do the same with the rest of the pieces in succession. The finished product should be a plate shaped somewhat like a triangle. This can be weighted flat while you prepare the leading edge strips. These should be medium hard strips 1/16" x 3/8". They keep the wing rigid and prevent edge splitting. Cement on the leading edge strips. Weight this all down on a flat surface to dry. Cut the fuselage from 1/8" medium balsa and round off the bottom edge. Cut the fins from medium soft 1/16" sheet, preferably B stock. Sand them to a normal streamlined section. If the wing is dry sand it smooth. Give the leading edges a rounded shape. Form a reflex section on the trailing edge by sanding on the bottom only. This gives part of the necessary longitudinal stability. You will have to add more "up" deflection here to get the model to fly

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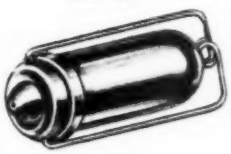

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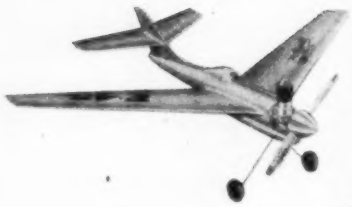

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properly. This can be done later when you test. The fuselage goes on, then the front and rear fins.

Prepare the downthrust block and aluminum foil exhaust protector. Do not cement these on at this time. First apply one light coat of sanding sealer. Finish it off with #400 Wetordry (light sand paper). If you desire color a very light spray coat is okay. Don't slop on heavy colored dope. Neat trim lines on a plain finish look fine. Check for warps. We have had some trouble with a special "tension warp" when we used light wood. Also too much finish will do it. If you try to twist the warp out of one side the other side pops up. There is only one way to cure it. Cut out the relief slots as shown in the plans to relieve the tension in the wood. Put some cement in the slots and check for trueness while it drys.

You should now place the *Jetex 50* unloaded in the motor mount and place this unit on the wing. Check for the 50% C.G. location by shifting forward or backward. Mark the place. Cement on the downthrust block. Some models will require more than others. Most get by with 1/8". The empty motor mount may now be fastened in place. We used a special rubber base glue EC 847, put out by the 3-M Company. Screws provided with the motor may be used. Put the thin aluminum foil directly behind the motor. We bought Reynolds *Wrap*, a household product. You could get the foil from cigaret wrappers. Model cement works for putting this on but we found that rubber cement is neater and easier. Put a cement film on the nose and bottom of the fuselage.

Adjust the model for a steady flat glide with unloaded motor in place. If it has diving tendencies you will have to add more "up" deflection on the trailing edge. Do this permanently by rubbing model cement along the top only of the trailing edge. Not too much or it will curl up extremely. You can warp in this deflection if not much is required. If the delta stalls something is probably wrong with your C.G. location. A slight turn is good so that under full power you get a fast spiral climb. The flight schedule should be as follows: light the fuse. When the motor is fired pull out the fuse quickly. Wait until the jet is hissing strongly. Launch with a firm glide for a low angle climb. The model will start climbing slowly but accelerates rapidly as long as the angle of attack is reasonably low. The speed increases, the nose goes up, the spiral tightens. Proper adjustment results in a smooth pull out and transition to glide. Normal flights average 45 seconds to one minute in dead air. Thermal flights occur easily on warm days. If your ship spirals in, correct this with rudder, change the thrust line to counteract the spiral, or alter the elevon setting. Elevons are not shown on the *50* but they are actually the warped up section on the trailing edge. The elevons are always kept up to some degree. Their relationship to each other effects turn adjustments. Therefore right elevon down (a little less up than the left) causes left turn. Right elevon up causes right turn. Loops are corrected by less up deflection, more downthrust, or C.G. moved forward. Because these models fly at high speed any small warp may cause trouble. Check this before flying.

A last thought on the *50*. If you have trouble adjusting this model because it is overpowered try loading it down with clay at the C.G. or make a new ship using 1/8" sheet for the wing. The heavier model is easier to fly and more consistent. When you have mastered this you can try the light high performance job.

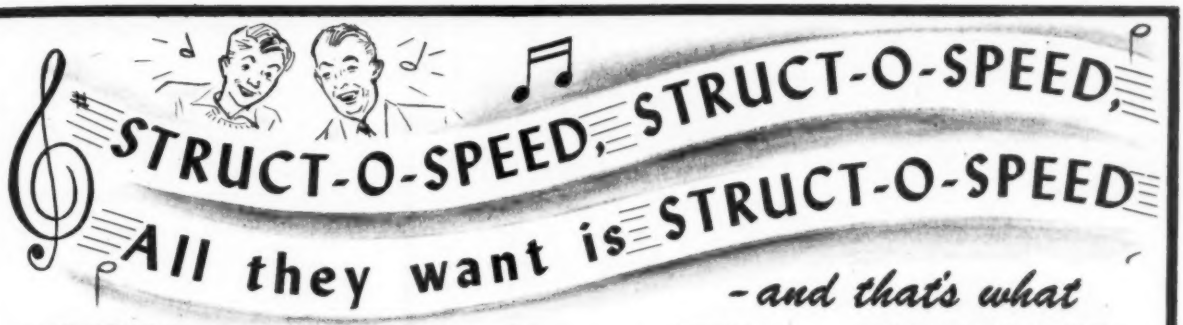
Delta 100. The first step is the building of the leading and trailing edges. The wood should be medium hard. You can substitute solid pieces 1/8" x 3/8" if you wish but this adds weight and cuts performance. Make the center rib from 1/8" sheet balsa medium light wood. The tip ribs are 1/16" hard balsa. Assemble the "triangle" starting with the trailing edge. Take doubled measurements from the half size plans so that the pieces are the correct length. The center rib is cemented between the two leading edges at the front. The spars are added later. The spar stiffener does not extend through the center rib. Now make the motor mount plate from two sheets of 1/32" balsa. Drill two holes in the proper place and use 2-56 machine screws to hold the motor mount clip in place. Plenty of cement around the nuts will help them stay in place when you remove the clip or make thrust adjustments. This completed mount may now be cemented in place. The position of this mount determines your C.G. location. This can be altered by enlarging the holes in the metal clip so that it can slide forward when the screws are loosened. Side-thrust can also be arranged in this manner. The next step is stringing the ribs in place. These thread ribs help maintain the airfoil section and provide strength. Make very shallow cuts every two inches along the top and bottom of the center rib for the thread to sink into. Push a pin through each tip rib as indicated on the plans. Do not use too much tension. Put a small amount of cement on each thread joint. Start from one pin and string the whole top, then the lower side of the wing. The pin head can now be pushed down flush with the top of the tip rib and cemented well. You may find it advisable to add one strip 1/16" x 1/8" on either side of and flush with the bottom of the center rib where the fuselage fastens on. It makes a stronger joint here.

Tissue is best for light weight and minimum warping. Cover only one half of the top at a time. It is very important that you start covering by attaching the paper to the leading edge. Then work back along the center rib from the front, and finally move outward along the trailing edge to the tip. In this manner the wrinkles work out at the tip. The lower surface of the wing can be covered with one piece. Do not water dope. A perfect dry covering job can develop SHRINKLES (wrinkles from shrinking) when water doped. This occurs because of the shape of the wing. Two thin coats of clear dope give the required finish.

Now the extra parts can be added. The fins are very simple to lay out. Use hard balsa for the framework. Cover and dope them and cement to the tip ribs. The front fin and cabin are all one piece of quarter grained 1/32" sheet balsa. The 1/8" medium balsa fuselage is put on next. If you wish to catapult launch the model cut the notch for this. Push a pin along the front of the notch and cement it. Next rubber cement the thin aluminum foil exhaust protector on top of the covering behind the *Jetex*. The asbestos furnished with the *Jetex* motor is far too heavy. The exhaust control vane is mounted last. The two side plates are cut from 1/16" sheet. They are cemented on to the trailing edge with just enough room between them to allow the vane to fit. The vane is also 1/16" sheet balsa. It should be sanded to a streamlined shape. We used a protective covering of the thin aluminum foil here. The masking tape elevons and rudders can now be put on. Although not the most permanent, these surfaces take adjustments easily and do not break. We used 3/4 inch tape, fastened on top, folded down, and fastened on the lower side. Dope the fuselage black and color the simulated cabin on the front fin.

Flying the *Delta 100* is much the same as the smaller model. But be prepared to run if you get a good adjustment. Be sure to test glide with empty motor. Get a steady flat glide with a large circle. We did test flying with half charges. The flight pattern is: light fuse. When the motor fires don't burn your fingers by trying to pull the fuse. Wait until it is burning well. Launch upward slightly and in the direction of its glide circle. Climb should be a fast steep spiral with power increasing in the last few seconds. To avoid stall outs keep away from a straight climb. Try to keep the angle of climb down. When the model attempts to go straight up the speed drops and the rocket becomes inefficient. Looping indicates the need for more incidence in the control vane, less up deflection on the elevons, or C.G. moved forward. Spiral dives are corrected with rudder, side-thrust with motor, or elevon settings. When you test fly take it easy. Watch what happens each time you make an adjustment. Test glide before each flight.

THE END



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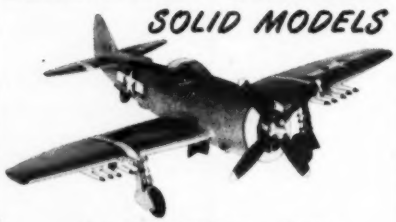

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Thomas-Morse MB-3

(Continued from page 28)

assisted in designing the Curtiss model "J", the original "Jenny". The move to Ithaca from the original plant site at Hammondsport coincided with financial help from the Morse Chain Company, which resulted in the Thomas-Morse company.

Following a series of highly successful rotary engined single seaters, the Thomas-Morse firm undertook a series of high-powered fighters carrying the designation prefix of "MB". MB-1 was a parasol monoplane externally braced and carrying a pilot and gunner. MB-2 was a biplane. Both were fitted with Liberty 12 engines. MB-2 was a highly streamlined plane with a well cowled engine, spinner and four bladed propeller; it looked like a single seater. From it evolved model MB-3, which became the first post-World War I single seat fighter ordered in quantity by the U. S. Air Service, and which formed the backbone of our pursuit squadrons of the early and middle 1920's.

Designers of the MB-3 had only one thing in mind. That was to equal, and possibly outdo, performance of any European plane of the same type. They borrowed freely from the standard configurations of existing types, produced an airplane that had absolutely no family resemblance to their previous designs. It had much of the look of the Spad, the dihedral of the S.E. 5, plus refinements that none of the other manufacturers had bothered about. The designers borrowed the wing radiator so widely used by the Germans, and the streamlined tie-rod interplane wiring of the R.A.F. The engine, called the Wright Model *H*, was a 300 hp Hispano Suiza made in this country under license from France by the Wright Aeronautical Corporation. This was truly a conglomerate design, but it took uninhibited Americans to take the best of what they knew and produce a first-class airplane.

Although the MB-3 was designed and construction begun in late 1918, it was not flown until February 21, 1919. Thus, too late for World War I, it nevertheless was a forecast of things to come, had the war lasted another year. The MB-3 was the result of much higher strength requirements than common among European nations. The idea was to build a fast, quick-climbing, strong, slow-landing fighter that still packed a wallop and possessed a wide range of maneuverability. That the MB-3 satisfied these requirements to a "T" is evidenced by the flood of enthusiasm which accompanied the February 21 test flights. Officials from Washington and Dayton, Ohio watched the plane go through its paces. It attained a speed of 164 mph and climbed to 10,000 ft. in 4 min. 52 sec. The first 1000 feet altitude was climbed at a rate equivalent to nearly 34.5 mph vertical speed, something of a miracle in those days! This performance, at the time understood to be a world's record, was duly recorded by the U. S. Director of Military Aeronautics.

Sandload tests conducted on the prototype (four examples were turned over to military authorities at McCook Field, Dayton, now Wright-Patterson Field) showed a safety factor of ten in the wing structure. A factor of eight was required. Control surfaces carried loads 50 per cent greater than called for in the contract, without failure or serious deflection of form. Individual spar tests revealed a safety factor of 15; at least these numbers were nearly twice as strong as requirements.

As a result of these tests on the four original models, Thomas-Morse was given a contract to produce 50 MB-3's, with deliveries beginning in March, 1919. These little biplanes proved a sensation among the squadrons receiving them, because they were such a vast improvement over anything previously assigned.

The MB-3 was a two-bay biplane spanning 28' upper and 24' 6" lower. Overall length was 20'. Its airfoil section was the proven R.A.F. 15, widely used on British types, which had given a good account of itself. Total lifting area of the wings was 228 sq. ft.; there was no stagger, and mean aerodynamic chord was 63-3/16". The lower wing was set at an angle

of incidence of minus 40 minutes throughout. Upper wing incidence was a positive 3° at the root and minus 40 minutes at the tips. This was an attempt to preserve tip effectiveness at high angles of attack.

Although the Wright model *H* was rated at 300 hp, figures based on full throttle output of 330 hp gave the MB-3 a power loading of 7.53 lbs. per hp, and a wing loading of 10.85 lbs. per sq. ft. This was at a fully loaded weight of 2,485 lbs. As originally designed, the MB-3 looked every inch the fighter it was. Radiators to cool water for the 300 hp Wright *H* were located in the upper center section. The exposed banks of the engine were streamlined front and back by bonnets made of stamped aluminum. Except for its interplane bracing, which resembled that of the Spad, the MB-3 was as clean as a hound's tooth. In its original form there was nothing hanging out in the breeze to create drag.

Soon after the first 50 ships built by Thomas-Morse were constructed, however, changes were made. These were inspired by wind tunnel tests conducted at the Massachusetts Institute of Technology in which new tail surfaces were developed. The general effect was better control and balance, both of which were desirable in such an airplane. From such tests were developed a new set of vertical and horizontal control surfaces which were incorporated in the models of the MB-3 designated MB-3A and built by Boeing Airplane Company, at Seattle.

But on the minus side were such things as the removal of engine coolant radiators from the center section to a pair of radiators, one on each side of the fuselage. The results of this, and other changes, was to lower the overall performance of the original Thomas-Morse MB-3, but the resulting MB-3A, as built by Boeing, still was as good, if not better, than anything the European nations turned out during the same period.

In the next issue we will discuss the production Boeing built MB-3A, which served until the late 1920's.

Folders Are Best

(*Continued from page* 31)

to your flight time.

While these tests were run primarily to convince ourselves of the superiority of the folding propeller, we would rather you didn't take our word for it. Instead, prove it to yourself by making a few minor changes on one of your own models. If your model features a folding propeller, the change-over to a combination will take you less than an hour. Should your model feature a freewheeling propeller, the change-over will require a few hours work.

The sketch of the propeller arrangement is the same as that which was used on the original propeller. The most important feature to consider is the correct relationship between the propeller engaging unit and the spring tensioner. When the spring tensioner is fully extended, the engaging unit should disengage from the propeller hub. This enables the propeller to function as a freewheeling unit, when the set screw is screwed in far enough to clear the stop on the propeller shaft.

The original model featured a retractable landing gear of the rubber tension type, which was temporarily fixed in the extended position. This was done to minimize the landing problem when the propeller was functioning as a freewheeler. If you've a landing gear of the same type, the first thing to do is remove the rubber tensioner. Then bend a shock strut from thin wire and solder it to the main strut. The free end is inserted in a piece of tubing that is set close enough to engage the shock strut with a reasonable amount of tension.

If you've done this much, then you're ready to conduct your own flight tests. After having done so, we know you'll have proved to yourself that folding props are tops. THE END

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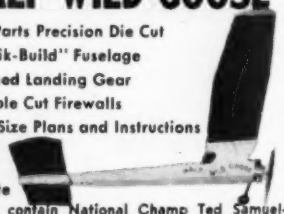

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M.A.N. At Work

(*Continued from page 1*)

▸ Down to Jasco for supplies. Ehling, that youthful contestant, had a birthday. Cake with four candles—how many years apiece, Frank? Where else can you buy sticks and be treated to cake and coffee? Always a big bull session, too. You arrive in the middle of an argument, then they ask your opinion with dead pans. No matter what you say, you get shot. Thick wings versus thin ones, big and small areas, will guys build different airplanes each time or just the same old reliables?

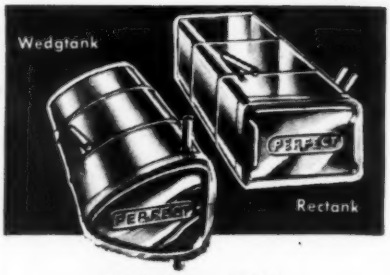
▸ Session with Artie Hasselbach, Consolidated, and the "wheels" of the Westchester County Airport, who want to put on a big contest. Artie has been through this so many times before that everything's set in jig time. He has a big box, full of equipment, watches, etc. When the alarm comes in, he picks it up and runs. Credit Irv Polk for setting things up. Irv is always in there pitching but you never hear about it.

▸ Artie and Mrs. Hasselbach were the subject of a feature in one of the Sunday papers. Phone calls ever since. Mostly from mothers who think models would be ideal for junior. Industry take note. Anyway, one of these pictures showed nine young 'uns. On the point of thinking we had lost by a run—but the caption said neighborhood kids. Close at that. Artie, by the way, has 800 prewar Bantams. Yes, that is 800. One side or a leg off!

▸ Henry Dore, from Louisville, stopped in on way back from France. He met Joe Elgin and Dave Kneeland at a French free flight contest. Though both lads astounded the Frenchmen with climbs triple the height of local standards, neither won. A jeep ran over one model and Elgin had a 21-second motor run. Since he didn't speak French, the meet was over before he found out. Henry reports M.A.N.'s comments on F.A.I. has everybody jabbering over there. How can you drop those old records without insulting the Russians? Dore is a towline enthusiast. Takes in many contests here but in three contests in Europe, he ended up 35th to 40th, despite good flights by our standards. The truth of the matter is that we are miles behind the Europeans in towline technique. Also said they stick 60's in 20 ounce free flights.

▸ In the man-bites-dog department, Harold DeBolt called up about an rc job that didn't rc. What Harold didn't know was the trouble everyone goes through with those gas filled tubes. Most exasperating contrivance invented by the mind of man. Guys age them for hours on end, even bake them in ovens. If you are lucky enough to have a sensitive tube, enjoy life while you can! Control Research's forthcoming two-tube is supposed to end the nonsense.

THE END



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Half-Wild Goose

(*Continued from page 26*)

to hold them tightly together until dry. When dry, cement in place on fuselage making certain the required ten degrees downthrust and one degree left-thrust is built in.

Cut the wing pylon from hard 1/8" balsa with grain running vertically and cement it in place, again measuring on plans to make certain the wing pylon has the necessary angle of incidence (leading edge 1/8" higher than trailing edge). Cover top and bottom of fuselage with 1/32" sheet rearward from former number six and 1/16" sheet forward from former number six. Cut the wing platform from two cross-grained layers of 1/16" sheet balsa, again checking angle of incidence with plans. Cut tail mount from 1/16" sheet balsa with grain running crosswise to fuselage and cement in place, measuring on plans to make certain the angle of stabilizer will be no degrees.

The wing uses cap strip construction which will not only form a perfect airfoil for this type of model, but also is light and strong, preventing the usual warps. Pin and cement leading and trailing edge to plans, notch trailing edge 3/32" for ribs, and cement 1/16" x 1/8" in place to form bottom half of ribs. Pin down 1/8" x 1/4" spars on top of bottom half of ribs and then bend and cement in place 1/16" x 1/8" to form top half of ribs. While wing is drying thoroughly, build stabilizer in same manner as wing using only one spar. When wing is completely dry, remove from plans and cut at polyhedral joints. Use hard balsa gussets from 1/16" sheet to cement proper amount of polyhedral into wing.

Cut rudder from 1/16" balsa and cement in between two center stabilizer ribs so that the bottom rear section of the rudder protrudes 1/16" below the bottom of the stabilizer and fits into a keying slot to be cut into the tail platform. Sand fuselage, wing and tail carefully and then cover wing and stabilizer with jap tissue or lightweight *Sky Sail*. Spray with water to tighten covering and when dry paint with two coats clear fuel proof dope. Colored tissue is recommended for wing and tail so as to give maximum visibility without sacrificing weight. Paint fuselage and rudder with two coats colored fuel-proof dope. When dope is dry, mount engine and timer (eye dropper tank may be substituted for timer if desired but engine will run more consistently if factory tank is used). Ted Samuelson used a K & B *Torpedo .049* with a 6-3 *Tornado* prop and K & B *Ultra Glow* fuel on his Nationals' winning *Half Wild Goose* but any AA engine can be used with good results. Bend wing hooks from .045 music wire or use two bobby pins or paper clips. Mount tail by hooking up dethermalizer elastics and mount wing with elastics as shown. Line up rudder perfectly straight and cement 1/8" square pieces to bottom of stabilizer leading edge so that front of stabilizer cannot move and throw rudder out of adjustment. Make certain bottom rear half of rudder fits into tail mount slot so that stabilizer has no degrees angle.

Balance your finished model by holding finger tips at extreme *trailing edge* of wing. By using a lighter or heavier wheel you can get a perfect balance. Remember that this model flies best with more of a tail heavy balance than the average AA free flight. If properly constructed and doped with no more than two coats of fuel proof dope, it should weigh exactly the required minimum of five ounces complete with *Spitfire* timer, K & B *Torp .049* engine, *Tornado* 6-3 prop and a tankful of fuel.

If the following instructions are followed carefully you can avoid unnecessary crackups while getting your model adjusted. Glide several times in calm air from a high place if possible so that the gliding characteristics can be carefully observed. If model is properly balanced it should glide straight with a definite stall. Remove the stall by tilting stabilizer with a strip of 1/32" x 1/8" balsa cemented under the left edge of the stabilizer which will give your model a left turn. Glide again, varying stabilizer tilt if necessary until a *flat* left turn of about 25' radius results with the model on the verge of a stall. Set the timer for five seconds, light the dethermalizer fuse and, with the motor idling, launch gently upward. Model should climb straight ahead. Watch carefully for turn to the right or left and correct by changing side-thrust. The original model requires one degree left-thrust. If your model dips slightly downward or does not climb, increase the angle of incidence in the wing by from 1/32" to 1/16". Now set your timer for full 15 second run and rev your motor to maximum speed. Your *Half Wild Goose* should climb straight, fast and steadily at about a 60 degree angle for the full 15 second motor run. If it makes more than one circle to the right during the full motor run give it a little more left-thrust as a straight climb will keep your model heading into the wind and result in a higher climb.

Test The Ryan

(*Continued from page 25*)

It was difficult for me to assemble the two half sections of the wing together, get the plywood pieces W-1 and W-2 on, all at one time, yet prevent warp and maintain correct dihedral. With templates of the dihedral traced from W-1 and W-2, the wing was set up like a free flight, the ends blocked up to the correct dihedral, pinned in place and left to dry. W-1 and W-2 were easily added later.

Flaps are optional in the plans but are recommended as they proved very effective. There was no difficulty encountered in completely cutting off the flap section from the wing and assembling the leading edge of the flap and the adjoining wing spar section in single pieces. In fact it made for more strength, better and easier alignment. Small sections of tubing were cemented as bushings for the outside wire hinge, where the actuating rod comes through the rib next to the flap and also next to the flap horn as it was found necessary to brace the actuating rod at that point to alleviate excess play. For this latter, 1/2" long pieces of tubing were slipped on the wire and eventually cemented to small blocks fitting between the tubing and bulkhead W-2.

Lack of a detailed control system in plans often confuses many model builders, particularly if it involves flaps or something slightly different. For "We Test", the conventional bell crank was used. In hooking up the flaps, if this system is used, do not bend or fasten the actuating rod to the flaps until complete installation is made at the bell crank. Two horns were made, one for each flap actuating rod. In this way, all soldering could be done outside the ship and slipped in later. For strength at the horns, the wire was bent at right angles about 1/2" from the end and the horn, a 1" x 1/4" piece of brass, was laid alongside the bent end, crimped around the wire and soldered. The hole for the flap push rod was drilled 3/4" out. A large *Veco* bell crank was cut down just inside the lead out wire holes and new holes drilled. It was mounted as far forward as possible. Next, bend flap push rod and assemble the flaps to the actuating rod. If the bell crank and flaps are assembled before the tail is cemented on, a Z-bend can be made in the elevator push rod and, by sliding the tail fore and aft, compensation can be made for any errors in the wire bending or flap assembly. Be sure flaps and elevator are both neutral.

A *Veco* control horn was used in place of the one made of 1/32" wire, putting the horn arm slightly off center. Use the hole nearest the center in a *Veco* bell crank for the flap push rod and the outside hole for the elevator push rod connecting to the outside hole of the *Veco* horn. This combination makes a good proportionate movement between flaps and elevator and a comparatively slow control at the flying handle. Be sure and complete installation of the bell crank, flaps and tank before assembling stringers.

Before putting on sheet covering, cement scrap balsa on top of the deck to seal off the cockpits from the rest of the body. Also, by sealing off at bulkhead F-1 directly behind the motor, no fuel can get to the inside of the ship.

Wing guides were made of wire bent in a spiral which allowed the flying wires to be

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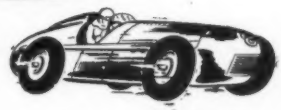
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slipped around and through them. This makes possible very short lead out wires which will not detract from the looks of the ship when not flying. For easy covering of the wing, flaps were spot cemented in neutral, the wing covered and doped, then the flaps slit loose and the rough edges doped down. In making the wheel pants, it was considerably easier to spot cement the two half sections of each pant and completely shape them before assembling on the ship.

The enlarged wing Ryan constituted very few changes from the original. The wing was set up in the same manner as called for in the plans but substituted a piece of 1/2" square balsa for the trailing edge. A second 1/2" square balsa strip was cemented to the front of the original trailing edge and that became the flap. 1/8" x 1/4" strips were cemented top and bottom at the rear of the leading edge and the ribs cap stripped with 1/8" x 1/4" balsa. When the leading edge, new trailing edge and flaps were sanded to contour, it resulted in a wing with a 6-1/2" chord and an increase in rib thickness of about 1/4". Instead of inserting the wingtips per the plans, an additional rib was added on the ends and 2" wide wingtips of sheet balsa added in the same manner as W-3. Flaps were hinged and then activated with the installation of a *Veco* control horn.

Firecracker

(*Continued from page* 34)

solder retaining washer on end. Now start front end of push rod forward, feeding it through holes in F, E, D and C. Do not attach tail at this point.

WING

Assemble wing cementing main panel and trailing edge panel together. Choice of wood is important here for a thin wing must have quarter-grained wood to hold shape and not warp. The wing will have a flat top surface, so plane bottom to taper up, starting at dotted line indicating fuselage side and out to panel ends. Cement wingtips in place and when dry, plane airfoil into top surface shown in root and tip sections. Airfoil is flat on bottom except on nose which rises as shown. Plane this bit off or sandpaper in place. Smooth wing with 2/0 sandpaper and finally #400 wet-or-dry. To counterbalance weight of flying wires on left side of ship, an iron washer of at least one oz. is imbedded on bottom of right wing and covered with 1/32" sheet balsa. Gouge a hole in top of wing for bellcrank. Bottom of hole should be at least 3/32" thick. Cement plywood plate in place. Dig 1/8" deep channels on wing bottom and imbed 3/32 O.D. aluminum tubes for lead guides. Cement and cover with 1/32" sheet balsa. Drill 7/64 hole for 4-40 machine screw and attach bent two inch bellcrank as shown. Dig out balsa for free running at bellcrank ends. Insert .021 steel flexible lead wires through tubes and attach to bellcrank by twisting ends and soldering. The bellcrank may be loosened or taken off to accomplish this. Make loops in outer ends and solder. The wing is next installed by sliding through fuselage slot and cementing. Now hook up push rod to bellcrank and slide tail fore and aft a tiny bit to get controls lined up perfectly neutral. Be sure nothing is binding, then cement tail to top of fuselage. Make vertical fin out of hard balsa, sanding to streamline. Mount on horizontal stabilizer and straight ahead. The rudder is made from 1/8" hard balsa and cemented to fin and fuselage with 1/4" right rudder to offset torque. Finish rear fuselage by cementing stringers of 1/16" x 1/8" balsa in notches and fairing into fin. Cover top of fuselage, by bending a water soaked 3/32" soft sheet balsa over formers. Keep in place with one inch gauze wrapping until wood dries. Holding high over gas flame speeds drying. Cement in place last.

LANDING GEAR AND TAIL SKID

Fill space between B and wing leading edge with balsa scrap. Cement plywood plate on top of wing as shown in drawing. Cut out landing gear from .051 aluminum alloy of 24st (hard). Bend up as shown and drill 7/64" holes through gear and bottom of fuselage. Secure with 4-40 machine screws and stop nuts. Attach wheels using 4-40 machine screw for axle and plain nut on outer side, stop nut on inner side. Make 1/16" plywood mounting plate for tail skid and cement the nut plate on upper side. Bend skid from 1/16" piano wire as drawn and fasten to under side of plywood, using 2-56 machine screws. Cement plywood between balsa sides. Skid can be replaced easily if worn flying from a hard surface. Add 1/8" sheet balsa bottom last.

ENGINE INSTALLATION

Mount McCoy .29 racing engine by drilling 7/64" holes through beams and secure with 4-40 screws. Tin nut-plates should be cemented to underside of beams making engine removable. Turn carburetor venturi about ten degrees to allow needle valve to miss motor beams and emerge from fuselage at cowl split line. A one oz. .008 shim brass gas tank is shown. Make by the wrap-around method for side, top and bottom. Use end plates to complete unit. Copper 1/8" O.D. tubing used for fillers and gas pick-up tube. The pick-up tube is placed about two-thirds back from tank front. Solder mounting bracket on top. Build a 1/16" sheet balsa box as shown to support tank. Secure tank to motor beams with small wood screws. The D-E fuel shut-off was reworked so fuel line passes straight through and is squeezed shut. Surgical rubber tubing with soft walls works best. Fasten shut-off to bulkhead B with a 2-56 machine screw. Bend 1/16" steel wire for cut-off rod and solder to push rod. Minute adjustment can be made by kinking this arm for tripping shut-off.

COWLING

Cut a medium balsa block to profile of lower engine cowl. Draw a half-circle of one inch radius on front and carve corners away. Sand smooth with 2/0 paper. Gouge inside to 5/32" thickness and sand smooth with 2/0 paper. Cut hole for air inlet about 7/16" wide by 1-1/8" high. The exhaust hole is cut out large enough to allow a tin extension to be inserted. This is a safety meas-

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ure to keep backfire from touching inflammable balsa and dope. Cement cowl in place on front of fuselage side balsa panels. Cut top cowl block to profile and carve corners off with a knife. Sand with 2/0 paper and gouge inside to 5/32" thickness. Sand inside smooth with 2/0 paper. Make quick release cowl lock next. Cement pine block to inside of cowl. Bend .040 or .064 steel wire as shown on bottom end. Bend .032 brass support. Drill hole to match your wire through cowl and block. Insert wire, solder washer and add spring. Slip brass bracket over bottom of wire end and secure to pine block with small wood screws. The 1/16" diameter steel wire catch is secured to top of motor beams with notched pieces of plywood and wood screws. Add a 1/8" sheet balsa former at rear of cowl to match former D in shape. Small balsa key blocks at each end are cemented to cowl on inner side. Sand entire ship with #400 wet or dry.

Give model two coats clear dope and sand lightly again with #400. Cover plane with Jap white tissue. First dope a panel with clear dope and place the piece of tissue over it. With another brush apply water over wet dope and smooth out wrinkles. Water will shrink paper when it dries. Do this in over a 70 degree temperature. Sand lightly with #400 again and with a filler such as Testors. Sand again and paint using a fuel proof dope. Remove engine, tank and shut-off to paint inside for protection against fuel. Original model was sprayed yellow. After painting, complete ship by adding molded canopy, spinner and prop.

FLYING

Check motor for running and be sure fuel shut-off works every time. Fly on test hop in no breeze and smooth surface. Start motor and run a little rich. Have helper hold model pointing out about five degrees from circle. Tell him not to shove upon releasing, but just let go. Take your place at center of circle and give proper arm signal when you are ready for release. Let ship roll until it runs about one-third of a lap and take-off slowly. Do not climb sharply or you may zoom up and stall out on a brand new ship. Go around about ten to fifteen feet high and get acquainted with the new plane's characteristics. Wait until you've flown a number of times to test shut-off, unless there is an emergency. When motor stops, nose ship down slightly and keep flying speed as you bring it in for beautiful wheel landing. Power is with a 9 x 8 propeller. *Firecracker* does 90 mph.

AMA News

(*Continued from page 36*)

"In the evening we all gathered for the banquet. The Elgins and the "cowboy" just couldn't get over the way the French eat. At noon, for instance, the meet stopped for a three-hour lunch period. We had champagne cocktails offered by the mayor, etc., etc.

"From the technical angle the meet was rather interesting. There were two main types of ships: the European and the American. Most European models were very large, their designers wanting to take advantage of the minimum wing loading allowed. This was the first year that the new F.A.I. rules were used and the European models seemed to show a lack of experimentation. They all had terrific glides but the climb was only fair on the average. Joe Elgin and Dave Kneeland had the typical American designs for an engine of .099 cu. ins. These models, of course, are the outcome of our four years experimentation with rules that are about the same as those used in Europe actually. I think everyone on the field recognized Elgin's model to be "tops."

"The meet ended with the traditional speeches and trophy presentations. We were awarded the tough luck prize."

Fifth Internationals best ever say all who attended. This year's classic saw a tie for high point in the Freshman division. Duplicate high point awards have been made to Chris. A. Hanson, Midland, Mich., and Fred W. Sage III, Independence, Mo. Junior high point was won by Richard A. Modler, Dayton, O., for the second straight year and Senior high point was won by Herbert L. Davis, Birmingham, Ala.

Added to this year's Plymouth Internationals was an F.A.I. jet record attempt by the Air Force's Tommy Baker. Tommy has quite a number of jet wins and national records and was able to do approximately 128 mph with his four pound F.A.I. jet model. This speed is being submitted to the F.A.I. and, if accepted as a record, will be the second F.A.I. record held by the United States.

National Records Established. *Outdoor Unlimited Rubber Models, Junior*—7:04.2. Record established June 30, 1951, by Done Tune, Los Angeles, Calif., using an original designed Wakefield model with the landing gear removed. His model had a wing span of 42" x 5" chord, overall fuselage length of 36", and a 17" prop. 16 strands of rubber (¼", we suppose) 48" long were used.

Outdoor Unlimited Rubber Models, Senior—16:12.0. Record established June 10, 1951, by Bob Brawner, Phoenix, Ariz. Bob's model was an original design with a wing span of 39", chord of 4", eliptical wing tips, and an overall fuselage length of 31". Prop used was carved from a block 1-1/2" x 2" x 15" and powered by 16 strands of 3/16" T-56, 34" long.

Outdoor Unlimited Rubber Models, Senior—18:00.0. Record established June 30, 1951, by Otto Heithecker of Detroit, Mich. Model used had a wing span of 200 sq. ins., square wing and elevator tips, R.A.F. 32 airfoil in wing, Clark Y airfoil in elevator, 38" overall fuselage length, and a single bladed prop with a diameter of 20" and pitch of 28". It was powered by 18 strands of 1/4" rubber, 50" long and braided.

National Records Pending. *Outdoor Rubber-Powered Helicopters, Junior*—2.11.2. Flights made by Thane Bopp, Kirkwood, Mo., on August 19, 1951, using a model designed by Harvey S. Robbers, Sr.

Free Flight Gas Models, R.O.G. Type, Class C Open—30:00.0. Perfect flights made by Kenneth E. Ernst, Indianapolis, Ind., on August 19, 1951, using an original design powered by an Ohlsson 60.

Free Flight Gas Models, R.O.W., Class AA Senior—15:54.0. Flights made by Paul de-Mounterice, Jr., Fishkill, N. Y., on August 19, 1951, using an original design which was powered by a K & B *Torp .049*. Model had a wing span of 30" x 5" chord and an overall fuselage length of 21".

F.A.I. Report. At the meeting of the F.A.I. Model Commission, Brussels, July 4-11, 1951, only one important change was made to the F.A.I. general model specifications. That change is the elimination of the minimum weight requirement for jet models which was previously four times the weight of the bare section (jet) motor. This change was one of our proposals. In conjunction with the weight requirement rules for reaction powered models, there is now imposed a maximum permissible weight of the model in flying order complete with fuel of 1000 grams (35.27 oz.).

There were a number of other proposals made at the F.A.I. Model Commission meeting but from what has been received, only the one real change was made. We have been expecting to receive a complete run-down of the meeting every day but it hasn't turned up yet.

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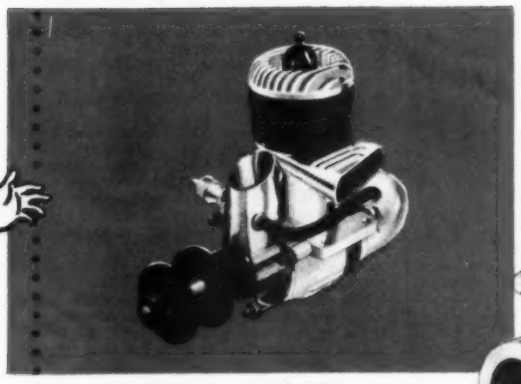

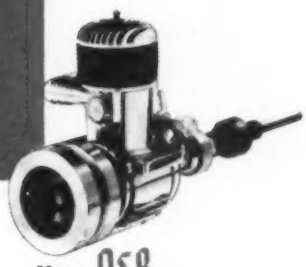

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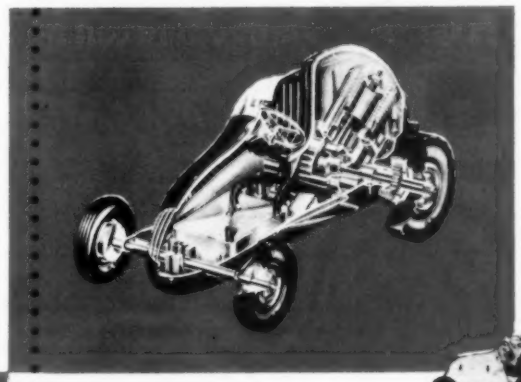

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nation, Great Britain now has the honor of being the world's speed champion. The deciding event was held at Knokke-sur-Mer, Belgium, on July 28, 29, and 30. Individual first place winners follow:

Concours D'elegance, Speed—P. Wright, Great Britain;

Concours D'elegance, Acrobatics—G. Hewitt, Great Britain;

Control Line Speed (.153 cu. ins. maximum) —93.87 mph. Hewitt, Great Britain;

Control Line Speed (.305 cu. ins. maximum) —125.32 mph. Wright, Great Britain;

Control Line Speed (.610 cu. ins. maximum) —125.72 mph. Labarde, France;

Control Line Speed Jet—157.53 mph. M. Claydon, Great Britain;

Acrobatics — Hewitt, Great Britain — 3200 points out of maximum of 3900.

The United States was not represented.

Get Set for the Tangerine Internationals. For those of you who plan to attend the Second Annual Tangerine Internationals, Orlando, Fla., December 28, 29 and 30 (see contest listing which follows for events, etc.), here is some useful information.

The altitude of the flying site, Pinecastle Air Force Base, is 95 feet above sea level. Average humidity for December is 91% at 7 a.m., 56% at 1 p.m., and 35% at 4 p.m. It was stated last year that the field had two 10,000 feet runways. This year the length of the runways is a military secret (they haven't plowed under any of the concrete).

Male contestants will be accommodated in barracks at Pinecastle AFB for 25c per night. Meals also will be served on the base at a charge of 35c per meal. Complimentary AMA licenses will be issued to all foreign competitors.

Did you get your renewal notice and application for 1952 AMA license yet? If not, it will be along any day if you had a license in '51. Be an early bird and rush your application to AMA, 1025 Connecticut Avenue, Washington 6, D. C.

Contests

NOVEMBER

4 — *Taft, Calif.* Taft Model Airplane Club Record Trials for FFG. Francis Stewart, Contest Director, 900-21 Bakersfield.

11 — *Bakersfield, Calif.* Bakersfield Record Trials for FFG. Francis Stewart, C.D., 900-21, Bakersfield.

18 — *Visalia, Calif.* Visalia Model Airplane Assn. Record Trials for FFG. Emory O. Hull, Jr., C.D., P. O. Box 284, Ivanhoe, Calif.

DECEMBER

2 — *Taft, Calif.* Taft Model Airplane Club Record Trials for FFG. Francis Stewart, C.D., 900-21, Bakersfield, Calif.

9 — *Bakersfield, Calif.* Bakersfield Record Trials for FFG. Francis Stewart, C.D., 900-21, Bakersfield.

16 — *Visalia, Calif.* Visalia Model Airplane Assn. Record Trials for FFG. Emory O. Hull, Jr., C.D., P. O. Box 284, Ivanhoe, Calif.

28, 29 & 30 — *Orlando, Fla.* Second Tangerine Internationals for OR, TLG, OHLG, FFG, Rubber Flying Scale, RC, CL, CLS, CLFS, and TR. For information address Tangerine Internationals, P. O. Box 123, Orlando.

AUGUST, 1952

3 — *Waynesboro, Pa.* Waynesboro Exchange Club Meet. Pending.

SEPTEMBER, 1952

1 — *Far Hills, N. J.* Bedminster-Far Hills Lions Club 5th Annual Control Line Meet. Pending.

21 — *Waynesboro.* Waynesboro Exchange Club Meet. Pending.

Key to listing of events: FFG — Free Flight Gas; CL — Control Line Speed; OR — Outdoor Rubber; TLG — Towline Glider; IR — Indoor Rubber; OHLG — Outdoor Hand-Launched Glider; IHLG — Indoor Hand-Launched Glider; CLS — Control Line Precision (Stunt); CLFS — Control Line Flying Scale; TR — Team Racing; RC — Radio Control.

Contests designated "Pending" mean the application is before the proper authorities as we go to press; "Record Trials" mean no prizes, but a chance at cracking the records; "Class A" is a meet with restricted entry; "Class AA" is a meet with unrestricted entry; "Class AAA" is a state-wide or regional meet; "Class AAAA" is a national or international meet.

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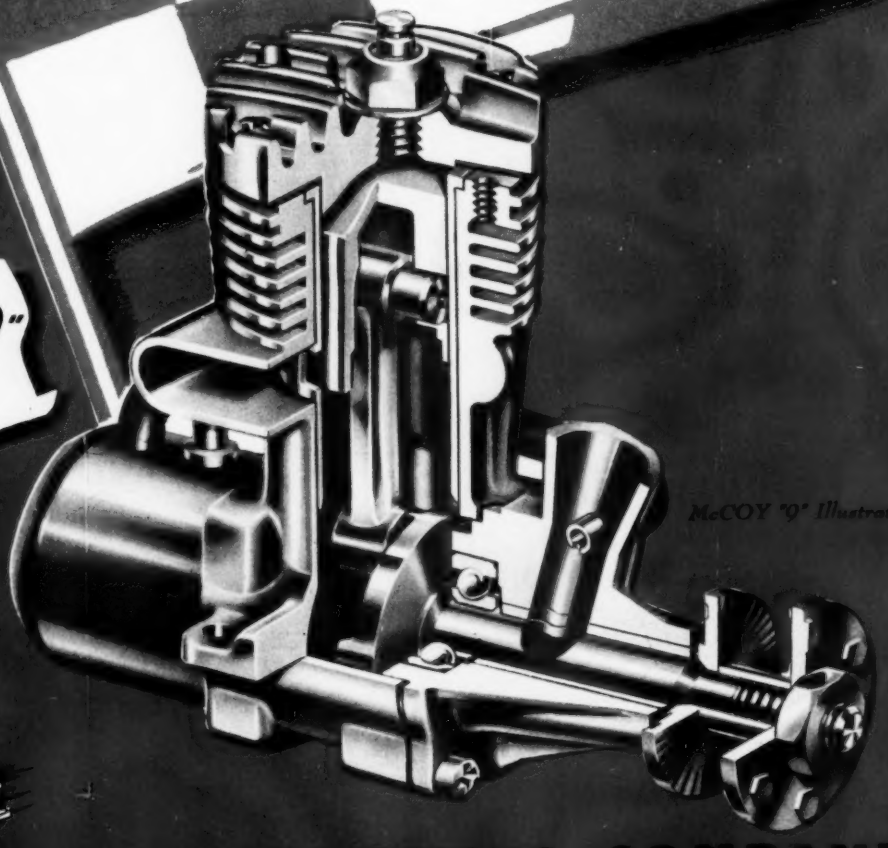

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